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About Our CONTRIBUTORS

GLENN E. WILHELMY, D.D.S. (University of Kansas City, School of Dentistry, 1929) specializes in oral rehabilitation. Doctor Wilhelmy first contributed to DIGEST fifteen years ago and has also published in other dental journals. His article in the current issue, CRITICAL EVALUATION OF ULTRASONICS IN OPERATIVE DENTISTRY, will be of special interest.

COYL B. THOMAS, D.D.S. (St. Louis University, School of Dentistry, 1929) practices general dentistry. For his first appearance in DIGEST Doctor Thomas presents the first of three articles to be published under the general title, MULTIPLE INLAYS: CROWNS AND BRIDGES.

LAWRENCE A. WEINBERG, A.B. (Brooklyn College, 1948), D.D.S. (New York University College of Dentistry, 1952) is well represented in dental literature with articles on a variety of subjects. In this issue he presents the second installment of his two-part article, FORCE DISTRIBUTION IN MASTICATION, CLENCHING, AND BRUXISM, for which he has made the illustrations.

ULYSSES CAMPBELL, D.D.S. (Howard University, Dental School, 1939) is a member of the dental staff of Harlem Hospital, New York City. For his first appearance in DIGEST Doctor Campbell presents in the current issue THE PROSTHETIC INDEX: A GUIDE TO ACCURACY IN IMMEDIATE DENTURE PROSTHESIS.

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Critical Evaluation of ULTRASONICS *in Operative Dentistry*

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DIGEST

The ultrasonic dental unit is used routinely by the author of this article for 85 per cent of all the operative dentistry in his office. No unusual aftereffects have been noted, patient acceptance is complete, and anesthesia has been virtually eliminated from his practice. This article reports eighteen months of experience in which more than 3,000 cavity and crown and jacket preparations were completed successfully. Step-by-step directions are presented for the techniques used in cavity and crown preparations with the ultrasonic dental unit.

General Factors

In the past two years a bewildering number of new operative instruments has been introduced to the dental profession. This new armamentaria, however, is readily classified as (A) high speed and ultrahigh speed rotary instruments, and (B) the ultrasonic dental unit.[1] The latter presents a completely new departure in dental equipment.

Precise Reduction of Tooth Structure Accomplished—Introduced more than two and a half years ago,[2] the ultrasonic dental unit, by eliminating rotary motion, provides the operator with the means for the vibrationless, noiseless, and heatless reduction of tooth structure with a precision hitherto unknown in dental techniques.

Patient Acceptance Complete—During the course of the past eighteen months in which over 3,000 different preparations have been completed with the ultrasonic dental unit, it has been demonstrated conclusively that this nonrotary instrument provides uniformly high levels of patient safety, comfort, and confidence. To date, not one patient has been willing to return to the rotary instrument and its usual concomitant (dental anesthesia) except in those increasingly rare situations where treatment absolutely requires the use of a rotary handpiece.

Range of Usefulness Increased—The ultrasonic dental unit has been used by the author for approximately 85 per cent of all preparations and as additional Cavitips are added to the present range of cutting tips, this high percentage will no doubt be increased and rotary handpieces will be used almost exclusively for certain polishing and grinding operations in the laboratory and for special applications in the oral cavity.

Specific Applications—During the year and a half reported in this article the ultrasonic dental unit has been utilized in the following procedures: (1) for all five classes of cavity preparation, (2) for crown and jacket techniques, and (3) when used only with the water coolant, rather than with the abrasive mixture, for periodontal scaling, prophylaxis, and root canal therapy.

Aftereffects Satisfactory—In all this time there has not been an incidence of unsatisfactory or unusual results from the use of ultrasonic instrumentation.

Comparisons Recorded—In the same period of time the author used rotary instruments with speeds ranging from 10,000 to 40,000 in order to compare the results obtained with the two different kinds of instruments.

Comparative Effects on Patients Studied—A careful study was made and recorded of the comparative effects upon the patients and the operator's reactions to the two completely different approaches to cavity and crown and jacket preparation. As a result of this study the rotary handpiece has been relegated by the author to the position of auxiliary equipment.

Advantages of Ultrasonic Unit

The elimination of gross vibration reduces to a minimum both the physical and psychologic causes of patient discomfort. Anesthesia has ceased to be necessary for the preparation of the deepest cavity or the most extensive crown preparation.

Anesthesia Eliminated—The advantages of dentistry without anesthesia in ensuring the utmost in patient safety as well as preventing damage to oral tissue are obvious.[3] If for any reason the instrument should overheat, the patient's natural pain reaction would immediately warn the dentist.

Possibility of Pulp Damage with Anesthesia—In rotary instrumentation with which 50 to 75 per cent of operative techniques in most offices are accomplished under some form of anesthesia, the inadvertent overheating of a tooth with consequent damage to the pulp, often goes unnoticed.

Slight Discomfort May be Experienced—It should not be assumed that the ultrasonic dental unit makes possible completely painless dentistry. When vital tissue is being removed

[1]The Cavitron Ultrasonic Dental Unit, developed and manufactured by the Cavitron Equipment Corporation of Long Island City, New York.

[2]Oman, Carl R., and Applebaum, Edmund: Ultrasonic Cavity Preparation, New York D.J. **20**:256-260 (June-July) 1954.

[3]McCarthy, K. C.: Fundamentals of Nitrous Oxide Anesthesia, (Abstract) DENTAL DIGEST **62**: 445 (October) 1956.

some measure of discomfort will be experienced, however slight.

Discomfort Less Intense—Patients have uniformly reported that where discomfort was noticeable, it was of shorter duration and far less intense than that experienced with rotary instruments.

Sharp Angles Obtained Routinely—Tooth surfaces cut with the ultrasonic instrument are unbelievably smooth, requiring little if any additional finishing. Point and line angles of geometric sharpness may be obtained routinely and flat walls and floors are also readily completed. There is little or no inadvertent undercutting with this instrument.

Answers to Questions Frequently Asked

Most of the published information on the ultrasonic dental unit in dental literature has referred to the relative effects of rotary and ultrasonic instruments on living tissue.[4,5,6,7,8,9,10,11,12,13,14,15,16] There is need for detailed clinical information on the instrument and its performance.

What is the Effect of Ultrasonic Dental Preparation on Dental Pulp?—This is invariably the first question asked regarding routine use of the ultrasonic dental unit. After a year and a half of routine office use of the instrument findings have been completely negative and no incidence of unfavorable aftereffects (radiographically or clinically) has been noted. This experience bears out at a clinical level the series of safety reports of biologic studies referred to previously.

Is the Degree of Visibility Limited?—In the author's opinion visibility is approximately equal to that obtained with the use of high speed rotary instruments and water spray. Morrison and Berman[17] state that the problem of visibility is "no harder to overcome than is the change from dry field operation to wet field operation." It is advisable, however, to utilize direct vision wherever possible, particularly when working on the upper molars. This procedure is greatly facilitated by tilting the chair back to the desired position.

Is the Instrument Less Time Consuming?—It is difficult to determine which instrument is actually faster. The ultrasonic handpiece is the author's instrument of choice in more than 85 per cent of all preparations and it is his belief that time is saved because it is unnecessary to wait for the onset of anesthesia. The fact that the patient is thoroughly relaxed is also a significant factor in the economy of time with the ultrasonic unit.

Is Fatigue Reduced?—As the patient is completely relaxed, the operator is far less fatigued at the end of the day and because the patient can tolerate more extended treatment periods the operator obtains greater productivity with less expenditure of effort. This also applies to the high and ultrahigh speed rotary instrument.

Possible Limitations

Although the ultrasonic dental unit will never entirely replace rotary instruments in the dental office, almost all operative procedures can be accomplished with the ultrasonic handpiece.

Accuracy and Precision—Granted the safety of the instrument, the most important single concern of the conscientious practitioner is whether the accuracy and precision of cavity and crown preparation necessary in the ideal cavity form is possible with the use of the ultrasonic dental unit.

Operator the Determining Factor—With the ultrasonic handpiece geometrically shaped tips are at last being utilized to attain the ideal geometric forms of classic dentistry. As a true feather touch is necessary, it may require some time for the average operator to develop optimum efficiency with the instrument.

Frictional Heat from Excess Pressure—Optimum cutting efficiency is obtained at pressures of from two to four or five ounces, or considerably less than the weight of the seven and a half ounce handpiece. As with rotary instruments, excess pressure may cause pain and discomfort from the development of frictional heat.

Cavitips Wear During Cutting—Normally, four to six preparations are obtained from each Cavitip, depending upon the amount of tooth structure removed. The tips are readily returned to their original evenness by running a stone over them for a few seconds. When approximately 2 millimeters have been worn down, however, the tip will no longer cut efficiciently and should be discarded. Cavitip costs are thus about equal to bur costs.

Development of Operative Skill

Depending upon the adaptability of the operator, reasonable skill with the ultrasonic handpiece may be acquired in a few days or weeks.

Variation from Standard Technique—It is necessary to rest the cutting tip gently on the tooth surface, allowing for the initial enamel penetration, rather than to travel with the handpiece as is done with rotary instruments.

Basic Method Recommended—The method the author has found to be most satisfactory in reducing tooth structure, either for crown preparations or for inlay or alloy preparations, differs somewhat from the standard rotary technique:

1. In all ultrasonic cavity preparation, attempt to go behind the caries and to cut into solid tooth structure.

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[4]Oman, Carl R., and Applebaum, Edmund: Ultrasonic Cavity Preparation, Second Progress Report, JADA **50**:414-417 (April) 1955.

[5]Friedman, Joel: Observations on Ultrasonic Tooth Preparation, J. New Jersey D. Soc. **26**:6 (July) 1955.

[6]Zinner, Doran D.: Ultrasonics in Dentistry, Proc. Am. Inst. Ultrasonics Med. **4**:1-12 (Aug.) 1955.

[7]Zinner, Doran D.: Recent Ultrasonic Studies, Including Periodontia, Without the use of an Abrasive, Abst. J.D. Res. **34**:748-749 (Oct.) 1955.

[8]Zach, Lee, and Brown, Gregory N.: Pulpal Effect of Ultrasonic Cavity Preparation Preliminary Report, New York D.J. **22**:9-17 (January) 1956.

[9]Roth, Lester Hugh.: Application of the Ultrasonic Dental Handpiece, West Virginia D.J. **30**:9 (January) 1956.

[10]Butt, Byron G.; Harris, Norman, O.: Shannon, Ira L.; and Zander, Helmut A.: Histopathological Evaluation of Pulpal Response to Ultrasonic Cavity Preparation. I.A.D.R. **34**:13 (March) 1956, Preprinted Abstracts 34.

[11]Zach, Leo: Thermogenetic Effect of Ultrasonic Cavity Preparation, I.A.D.R. **34**:41 (March) 1956, Preprinted Abstracts 104.

[12]Friedman, Joel; Lite, Theodore; and Solomon, Harold: Pulp Reactions to Ultrasonic Tooth Preparation. New York J.D. **26**:144-148 (April) 1956.

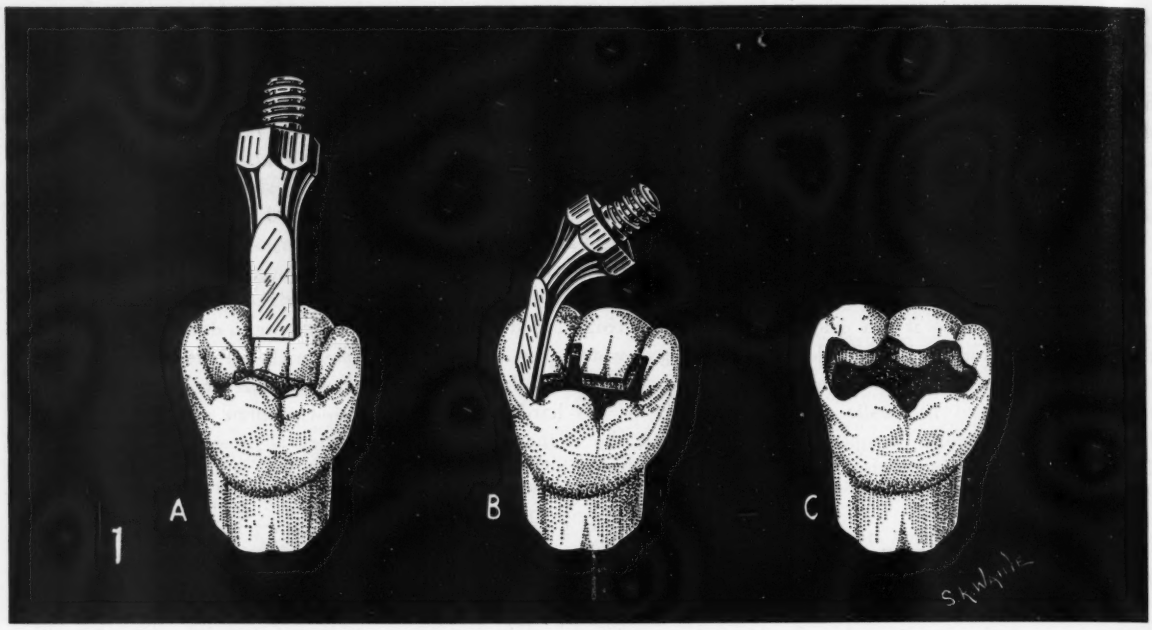
[13]Zinner, Doran D., and Whetstone, Wendell L.: The Ultrasonic Dental Unit in Pedodontics, J.D. Children **23**:3-11 (1st Quarter) 1956.

[14]Healey, Harry J.; Patterson, Samuel S.; and Van Huysen, Grant: Pulp Reaction to Ultrasonic Cavity Preparation, U.S. Armed Forces M.J. **7**:685 (May) 1956.

[15]Lefkowitz, William: The Comparative Effects of High and Low Speed Rotary Instruments, Air-brasive and the Ultrasonic Dental Unit upon Pulps of Canine Teeth, reported as part of the symposium of New Cutting Methods presented at the Mid-Winter meeting of the Chicago Dental Society, February 7, 1956.

[16]Robinson, Hamilton B. G.: Reactions of Dental Pulps to Injury, presented in Washington, D.C. before the American Academy of Oral Pathology, April 8, 1956.

[17]Ultrasonic Dental Research Group of Chicago: Using the Ultrasonic Dental Unit in Restorative Technics, Illinois D.J. **25**:770 (December) 1956.



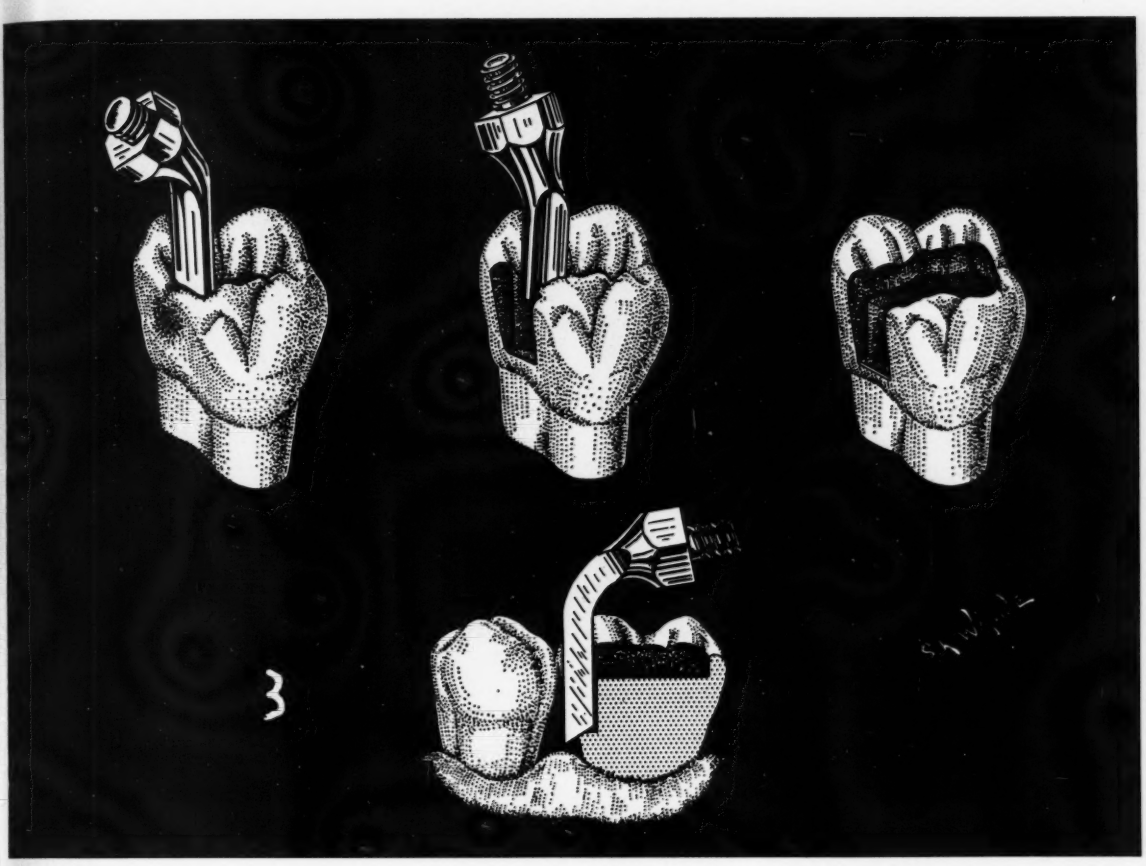
2. On occlusal surfaces where maximum caries appears, it is sometimes advisable to make two or three cuts in order to find the extent of the carious dentin under the enamel.

3. The several seconds which may be required for this approach are more than made up once the extent of the carious area is known and solid tooth structure is reached.

1. ***Lower molar (entire-occlusal).***
2. ***Class II preparation, method A. An upper molar is shown with caries in the mesial aspect.***

Procedures

Class I Cavities—To prepare Class I cavities the following steps may be taken:



3. ***Class II preparation, method B. A boxing tip No. 10 is shown placed behind the mesial margin ridge and behind the carious area.***

1. Use a rectangular Cavitip on the central groove of the surface and allow it to penetrate to the desired depth (Fig. 1a).

2. Start the next cut with the handpiece at right angles to its original position and open the mesial and distal fossae (Fig. 1b).

3. Connect these cuts with the original cut and plane the walls of the cavity with the sides of the Cavitip in order to obtain a continuous outline (Fig. 1c).

4. The cavosurface bevel is easily established where necessary by angling the Cavitip in the direction of the enamel rods.

Class II Cavities—There are two basic methods for preparing a Class II cavity. The operator's choice is determined by the extent of the carious area. If the proximal carious lesion is wide, covering virtually the entire proximal area, it is preferable to apply the technique described in Method A and to use the technique in Method B only when the extension of caries is smaller than the width of the Cavitip for MOD inlay and similar preparations.

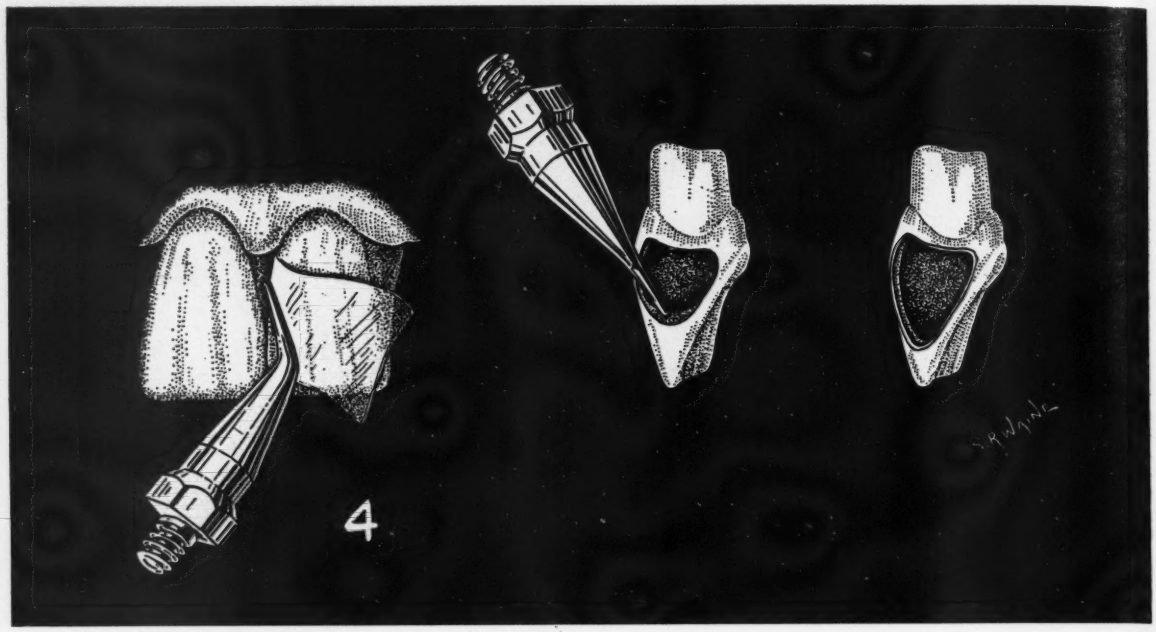
Method A: In Figure 2 is shown an upper molar with caries in the mesial aspect. It can be seen in Figure 2b that the tip of the instrument is placed to the pulpal side of the caries. It is allowed to sink to the depth considered necessary by the operator.

Figure 2C: The second cut (Fig. 2c) is made mesial and lingual or buccal to the caries. When this cut is made, the vertical wall of the box of the cavity is formed at the same time. The process is reversed and the opposite wall is prepared. By boxing caries in this manner the entire carious area may be broken out in one piece.

Figure 2D: In this figure the box has been formed. The handpiece is then turned sideways and the point, which is a No. 10, is used to open the groove. The same procedure is used on the distal. The tip is changed to a No. 2 boxing tool (Fig. 2e) for the final extension for prevention.

Method B: Figure 3 shows the placement of boxing tip No. 10 behind the mesial margin ridge and behind the carious area: (1) Let the tip penetrate to the desired depth. (2) Guide the handpiece straight out in a proximal direction, thus creating the proximal box in a single cut. (3) Turn the handpiece sideways in order to obtain the grooves.

Class III Cavities—In Class III preparations the operator's most serious problem is that of possible damage to the adjacent teeth. When using the ultrasonic Cavitip there are fewer risks of such damage. The small cylindrical tips used for these preparations can produce a cut in the adjacent tooth only when rested against it for



4. ***Class III, interproximal preparation, anterior.***

an extended period of time. In case of extremely narrow contact it is advisable to protect the adjacent tooth with a metal or celluloid strip. The following steps are taken:

1. A cylindrical tip, No. 30 or No. 31, (Fig. 4) is placed on the interproximal surface and is moved labiolingually as well as gingivally, producing the gingival part of the preparation.

2. The same tip is directed incisally to produce the incisal walls and point angle.

3. Bevel by planing the enamel with the side of the Cavitip.

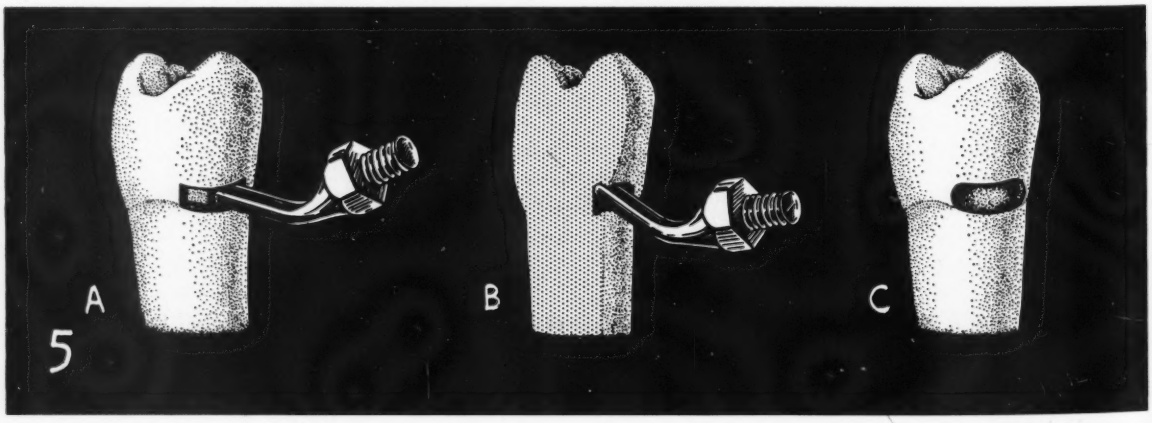
Class V Cavities—Two different types of Cavitips are used to obtain the finished cavity form desired. The tip shown in the accompanying drawings is a concave-convex tip known as No. 40 Cavitip. With this tip the area of caries in some cases may be completely covered. All that is necessary once the initial cut is made is to establish the required retention walls by moving the tip up or down. The other tip most frequently used for this purpose is a round tip No. 31. With this tip the cavity can be formed precisely as it might be formed with a standard bur or diamond stone. Whether undercuts for retention or parallel walls with flat seats for inlay preparations or finished shoulders for jacket crown preparations are wanted, the ultrasonic handpiece is the most accurate of all cutting instruments to date.

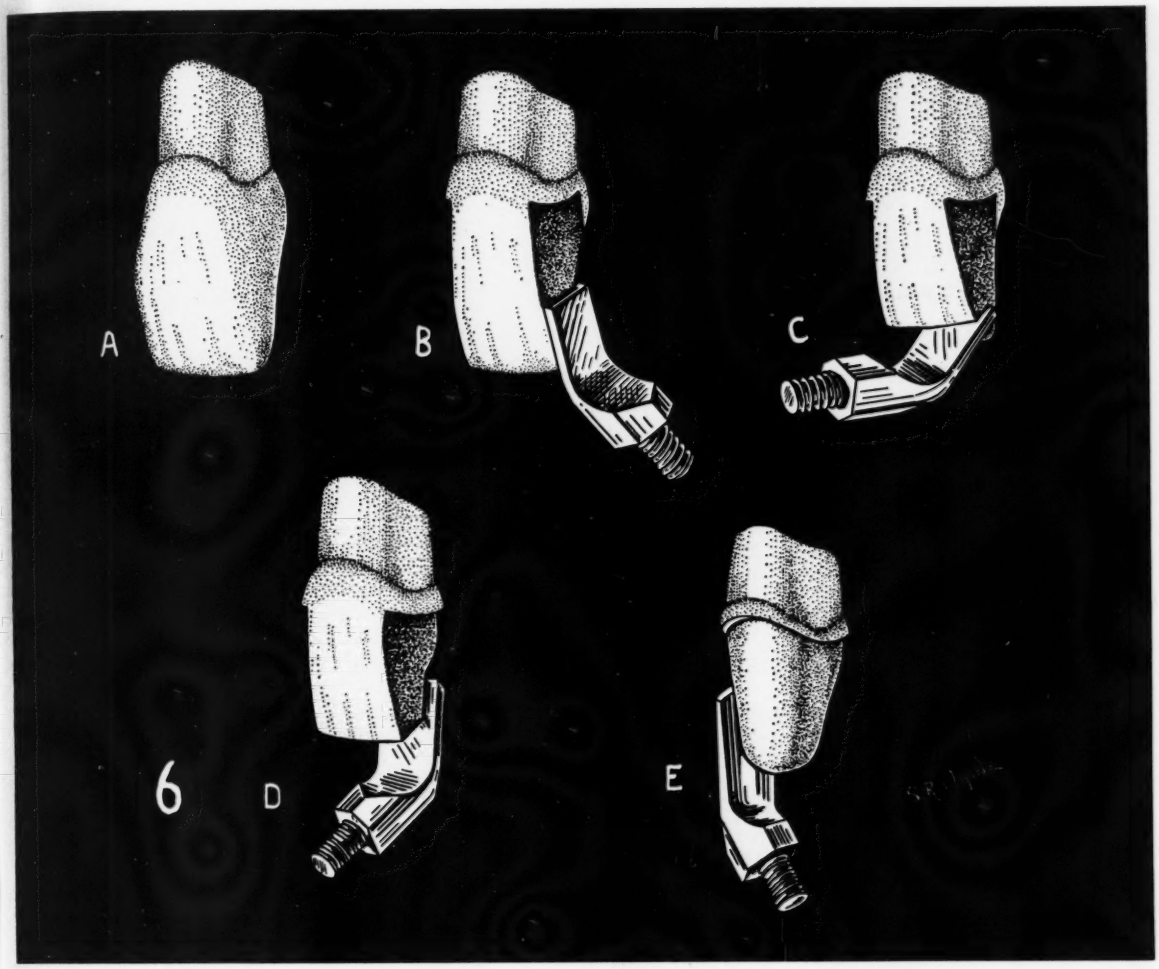
5. ***For Class V preparations two different types of Cavitips are used to obtain the finished cavity form desired. The tip shown is a concave-convex tip, No. 40 Cavitip.***

Procedure For Full Crown Preparation

For the jacket crown preparation, the ultrasonic dental unit is much faster and more accurate than any rotary instrument used by the author. The following steps are taken:

1. The first slice is made either incisally or distally and straight up to





6. ***Full crown preparation. Positions of the Cavitip in the successive steps in this procedure are shown.***

the gingival margin at whatever depth the shoulder is to be formed (Fig. 6b). After the original cut is made, the same procedure is followed on the opposite side.

2. The incisal edge is removed with the same tip and the tooth is reduced to the desired length (Fig. 6c).

3. The lingual edge is reduced with the same tip (Fig. 6d). The tips are changed in jacket preparations only when the finished shoulder is to be formed.

Method to Finish Shoulder—A stone is used in the rotary handpiece to fashion a Cavitip the precise shape desired for the shoulder. The tip is placed against the shoulder which resulted from the original cut, and the new curvature of the tip is allowed to form the desired shoulder (Fig. 6e). An exact depth and thickness can be obtained with this method. The shoulder is invariably polished, the corners are square, and the base is flat.

Subgingival Injuries Reduced—A major advantage of the ultrasonic handpiece in crown preparation is the fact that the instrument is much more favorable to soft tissue than are conventional rotary instruments. Postoperative symptoms of hot and cold sensitivity are markedly reduced. When properly used, the ultrasonic cutting tool is harmless to soft tissue because it cannot abrade or tear, thus eliminating injuries in subgingival operations and reducing bleeding in these areas to a minimum.

Procedure for Periodontia and Prophylaxis

The ultrasonic handpiece removes calculus with unusual thoroughness and can be effectively used for subgingival scaling with a minimum of bleeding. Because only water is used on the Cavitip for prophylaxis there is no danger to structure. This new method of scaling is faster and much less painful to the patient than hand scaling. It is less fatiguing for the dentist because a gentle massaging motion replaces the tedious painstaking curettage normally undertaken with hand instruments.

General Observations

The following disadvantages of the ultrasonic unit become less disturbing with continued use of the equipment:

(Continued on page 134)

MULTIPLE INLAYS

Crowns and Bridges—Part One

COYLE B. THOMAS, D.D.S., Lebanon, Missouri

DIGEST

This is the first of three practical articles to be published under the general title "Multiple Inlays—Crowns and Bridges." The author of the articles has demonstrated the technique described at clinics on gold restorations for several years. Each step in the procedure to be followed is presented in detail and illustrated.

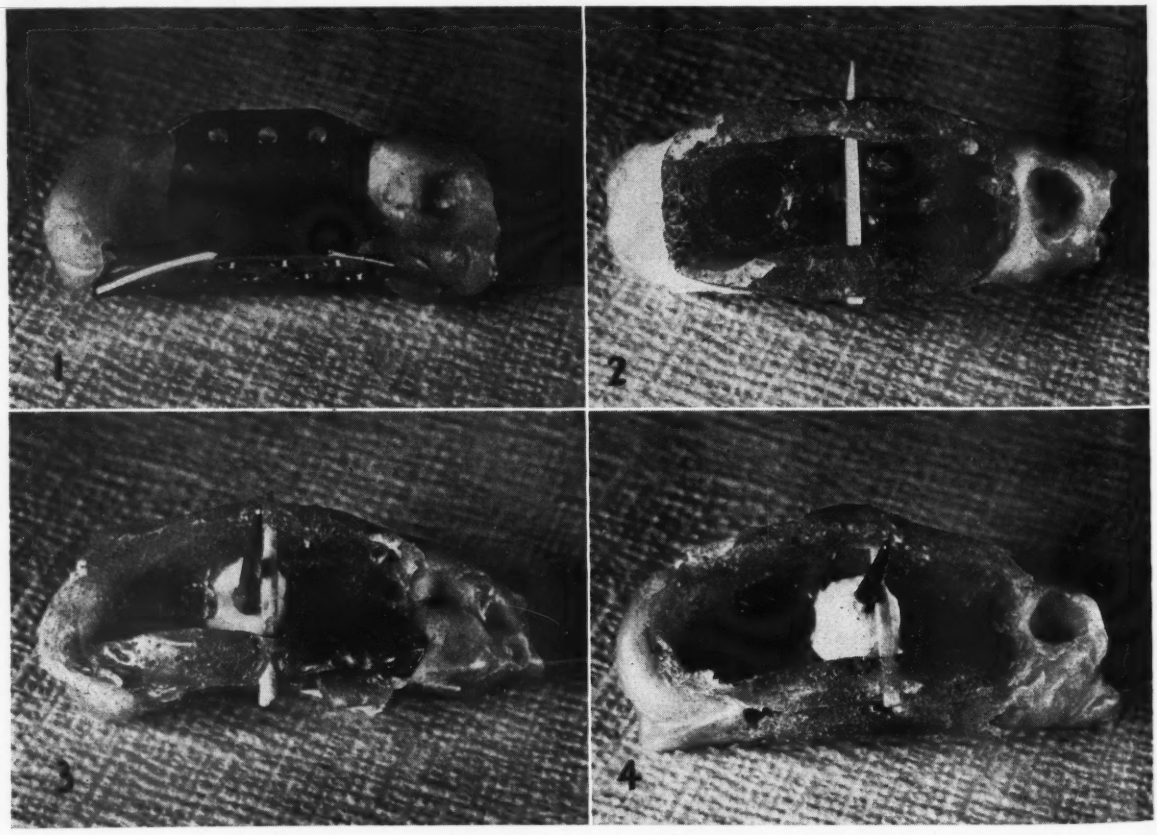
Precision Positioning of the Die in the Cast

To complete this technique the following steps are taken:

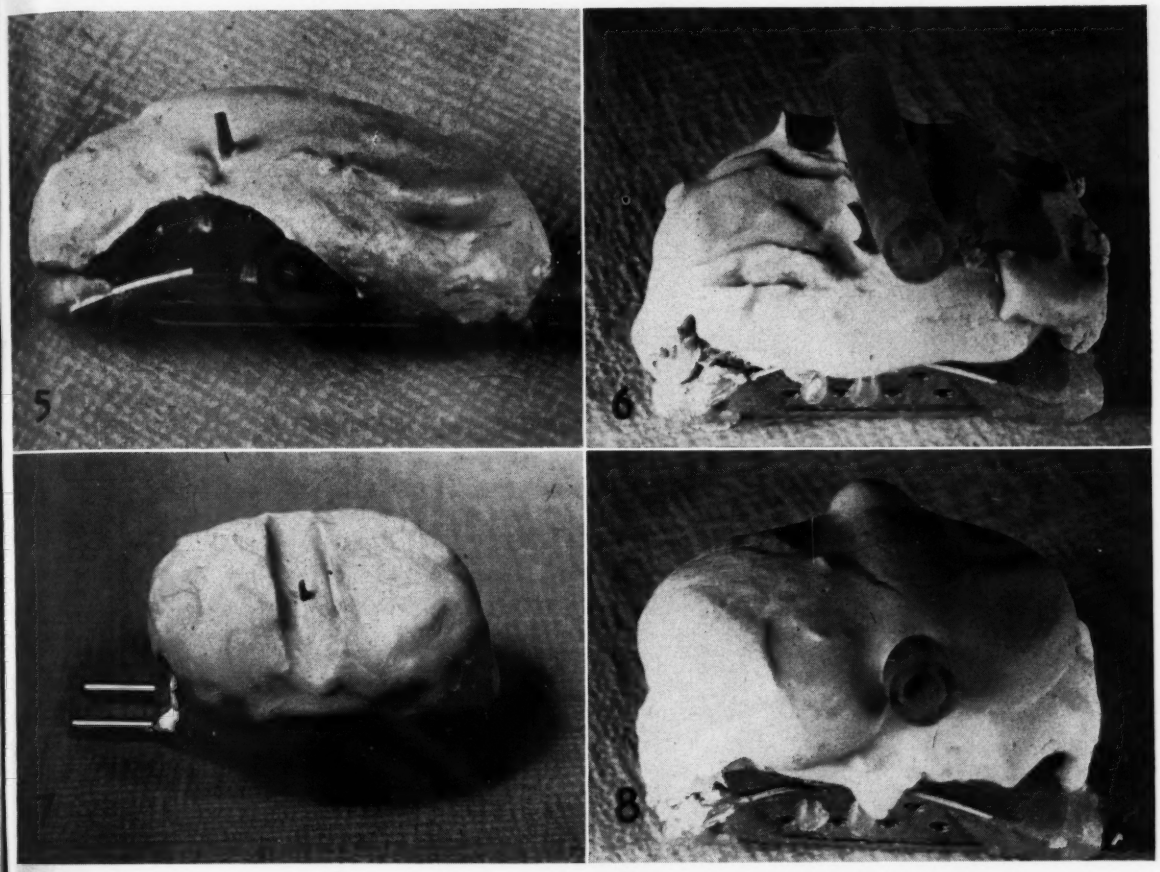
1. Secure an impression in hydrocolloid, using a water-cooled tray (Fig. 1). Sharpen a toothpick and thrust it through the impression a little to one side of the center of the tooth that has been prepared to receive an inlay, three-quarter crown, or full crown (Fig. 2). The purpose of the toothpick is to hold the dowel pin in place while the stone mix is vibrated into the impression.

2. Make a mix of one of the gypsum base model materials and vibrate it into the impression of the prepared tooth until the tooth impression is filled level with the approximating tooth impressions (Fig. 3).

3. Place a dowel pin of the type that is flattened on one side, in the center of the poured impression and lute it to the toothpick with sticky



1. *Water-cooled tray prepared to receive hydrocolloid.*
2. *Impression in hydrocolloid with sharpened toothpick inserted over, and a little to one side of center of the impression of the tooth prepared to receive inlay or crown.*
3. *Model material poured into the impression level with the approximating impressions and dowel pin luted to toothpick with sticky wax.*
4. *Remainder of the model material poured around the base of the dowel pin is cone shaped.*



5. ***After the model material has set and separating medium has been applied to it, a mix of stone is poured into the impression almost to the tip of the pin.***
6. ***Rubber hole-former placed across the tip of the dowel pin.***
7. ***This illustrates the amount of the end of the dowel pin that should be covered with the rubber hole-former.***
8. ***Hole-former in position with remainder of stone placed over it. Care is taken not to dislodge the hole-former while so doing.***

wax (Fig. 3) taking care to place it in a true vertical position so that later it may be removed easily without locking between the adjoining teeth.

4. Place some of the model mix around the base of the pin and vibrate, forming a cone-shaped mass around the dowel. A little may spill over into the side of the approximating tooth impressions. Wipe these margins clean with a square ended cement spatula, tapering the margins in the same manner as the cone-shaped mass (Fig. 4).

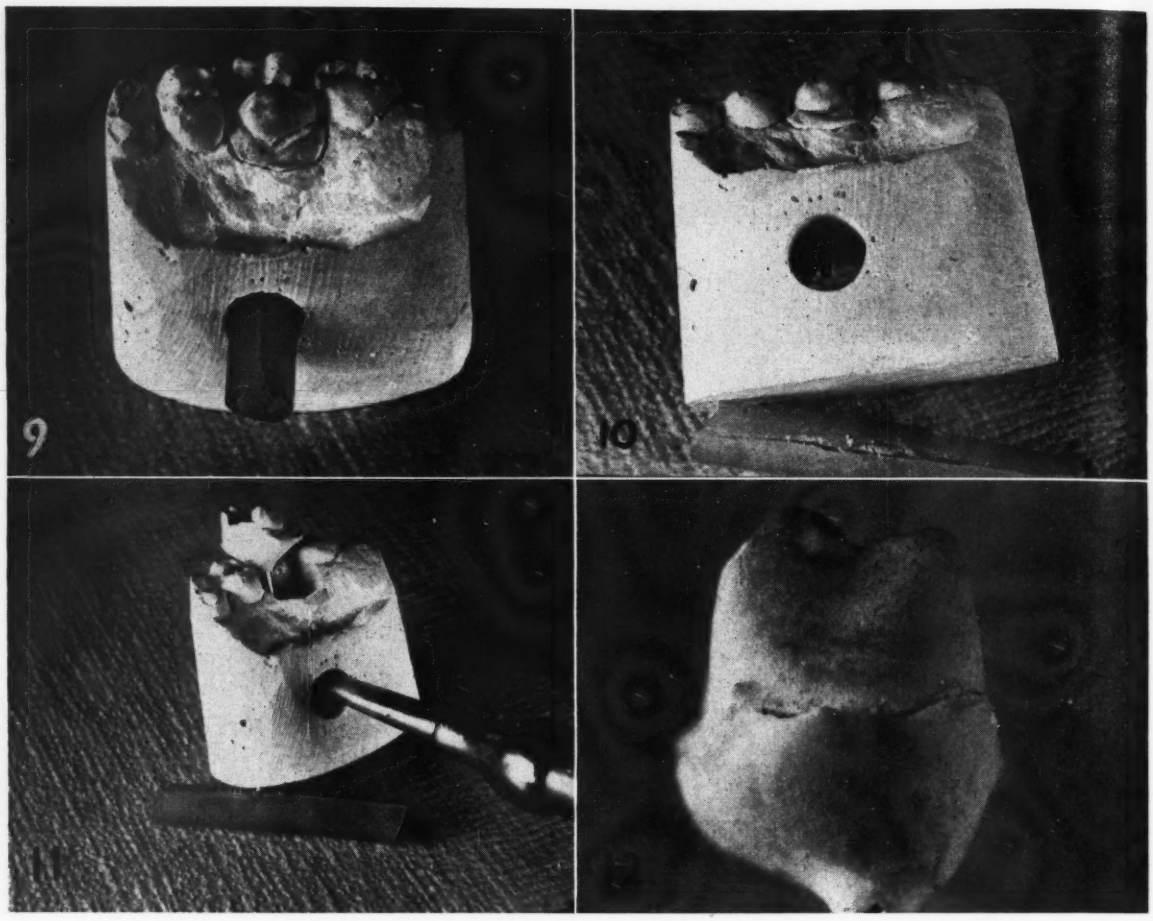
Use of Separating Medium—While this material sets return to the patient, place a temporary restoration if indicated, and dismiss him. This "pour" will set sufficiently hard within a few moments so that it will not flow while vibrating a mix of stone into the impression after coating the first "pour" with a separating medium. Water glass (sodium silicate) purchased at the drug store makes an excellent separating medium when diluted with an equal amount of water. When pouring the stone leave a little of the dowel showing above the stone.

Gaining Access to End of Dowel—Place a small (2-inch) length of rubber tubing across the pin. This serves to make an opening to the end of the dowel into which an instrument may be inserted to remove the dowel and attached die. This rubber tube (hole-former) may be prepared by stripping the fabric from old saliva ejector tubing, cutting into two-inch lengths, and splitting lengthwise.

Use of Tube—In use a small amount of modeling clay is placed into the tube and the tube is impaled upon the end of the dowel. The clay will serve to prevent the dowel being forced too far into the tube. The split in the tube will allow it to be withdrawn from the dowel when the stone has set (Figs. 5, 6, 7, and 8).

Dowel Removed—When the stone has set, pull the rubber hole-former from the cast. This will leave a hole in the cast leading to the tip of the dowel. An instrument may be inserted into the hole and the dowel with attached die removed with pressure upon the end (Figs. 9, 10, 11, and 12).

The die may now be lubricated and the inlay or crown waxed and cast



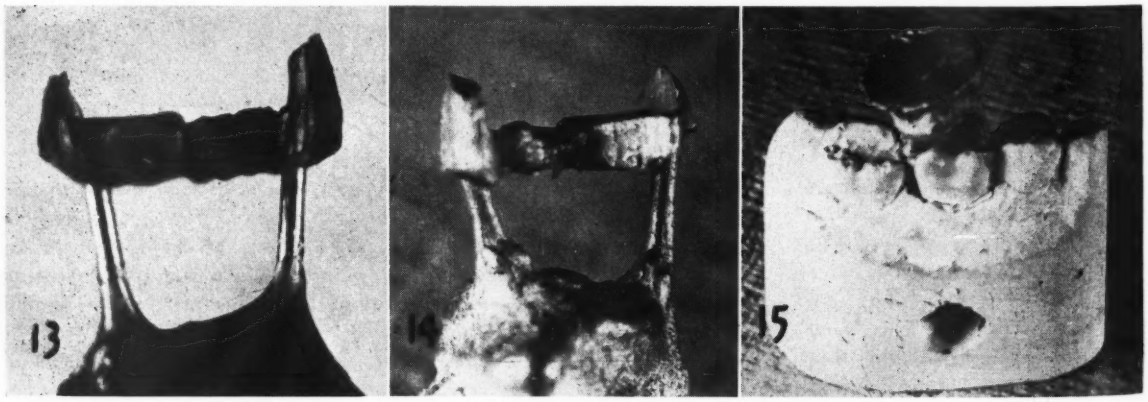
9. *Cast removed from impression showing end of the hole-former protuding.*
10. *Cast with hole-former removed showing the tip of the dowel pin with sufficient space to insert the instrument below end to remove die from cast.*
11. *Removing the die with the aid of an old elevator.*
12. *The die as it appears after removing from the cast. Note cone-shaped base.*

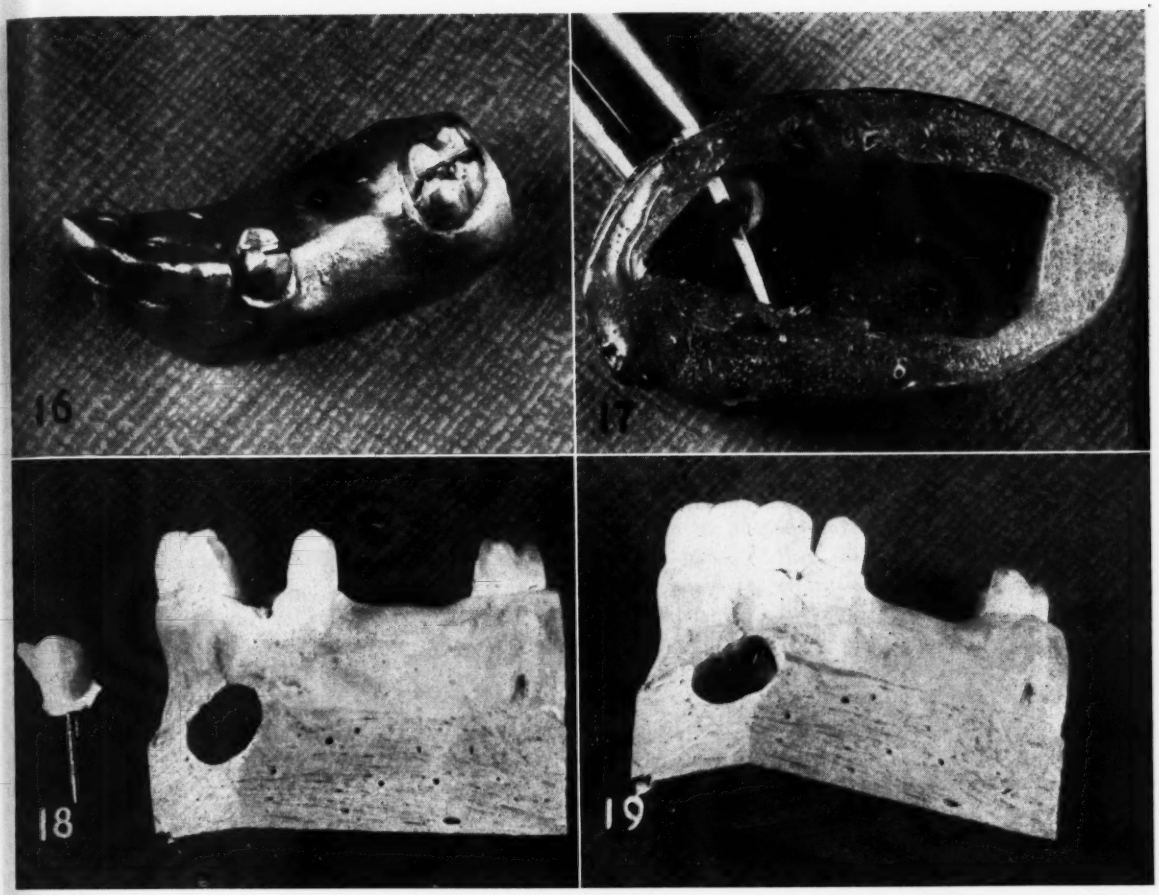
(Figs. 13, 14, and 15).

Fast and Accurate Technique

The speed and accuracy with which the die is positioned in the case are readily explained when it is noted that the die is not removed from the impression to be trimmed nor for *any* reason from the beginning of the pour

13. *Wax pattern removed from die.*
14. *Cast gold inlay.*
15. *Inlay seated upon die.*





16. ***Technique model showing abutments prepared for bridge.***
17. ***The impression with model poured into tooth impression approximating abutment preparation.***
18. ***The cast with tooth removed next to abutment preparation showing access to abutment.***
19. ***The cast with approximating tooth replaced.***

until it is completed. Actually, the impression is poured only once, but in two stages, waiting for the first pour (the die) to set before pouring the remainder of the impression.

Preparation for Bridge—In the case of a bridge preparation (Fig. 16), pour the model material and place the dowel in the tooth preparation approximating the impression of the abutment (Fig. 17).

Access Provided for Waxing—The tooth on the cast next to the abutment may be removed (Fig. 18) giving access to the abutment preparation for waxing (Fig. 19). The tooth may be replaced to secure the proper contact.

Accuracy Ensured—In this technique the abutment dies are not removed from the impression *or from the cast* at any time and their relation is as accurate as hydrocolloid and stone.

Full Mouth Impression Used—It is emphasized that full mouth impressions are used for all bridge cases. Models are used in these illustrations, however, showing segments of an arch.

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FORCE DISTRIBUTION

in Mastication, Clenching, and Bruxism—

Part Two

LAWRENCE A. WEINBERG, A.B., D.D.S., Brooklyn, New York

DIGEST

In this second and final installment of his article the author discusses the various torque-producing factors involved in lateral eccentric clenching, bruxism, and the relation of frictional resistance and the incline plane. In conclusion, suggestions are presented for the correction of premature contacts in eccentric relations.

Clenching

Clenching, bruxism, and mastication exert different forces to the supporting structures. As Kurth[6] points out, occlusal pressure in centric is often thought of as a vertical force, but in reality it seldom is purely vertical. Due to the hinge axis of rotation, as the mandible swings upward into centric, there is a forward or anterior component due to the arc originating from a center (condyle) above the occlusal plane. Furthermore, if a cusp does not strike a fossa, but does contact an incline there will be force perpendicular to that incline on the periodontal support. The resultant force will depend not only on the arc of rotation of the mandible but, even more important, on the angulation of the contacting surfaces.

Clenching in Lateral Eccentric

Many patients form clenching habits rather than bruxism and frequently acquire a combination of both. The teeth can be brought together in lateral eccentric and a clenching force brought to bear; by unconscious muscular effort the mandible can be prevented from gliding up the inclines toward centric. This results in a pressure perpendicular to the inclined surface. The result of this action is expressed in torque, which is an engineering term for the rotating force on an object. Torque is usually expressed in inch or foot-pounds derived by the force multiplied by the perpendicular distance from the center of rotation. It can be expressed as: $T = FD$.

Center of Rotation may Shift—The pinpoint location of the center of rotation is not possible to locate more accurately than in the general area of the apical third.[13] Due to many factors such as (1) alveolar height, (2) root shape, and (3) differences in the periodontal membrane, the center of rotation may shift. The center of rotation is taken arbitrarily as the apical third to arrive at comparative values in this article but it is emphasized that this is not to be interpreted as a "mathematical analysis."

Force Perpendicular to Incline Plane—As shown in Figure 8, with only buccal contact a force applied to the upper buccal cusp incline by a clenching pressure will result in a force perpendicular to the incline plane. If an arbitrary value of 20 pounds is applied by the lower jaw to the incline and the perpendicular distance from the center of rotation is 0.5 inches, then the torque is 10 inch-pounds.

Torque Resulting From the Upper Buccal and Lingual Cusps — When lingual contact (F_2, Fig. 8) is pres-

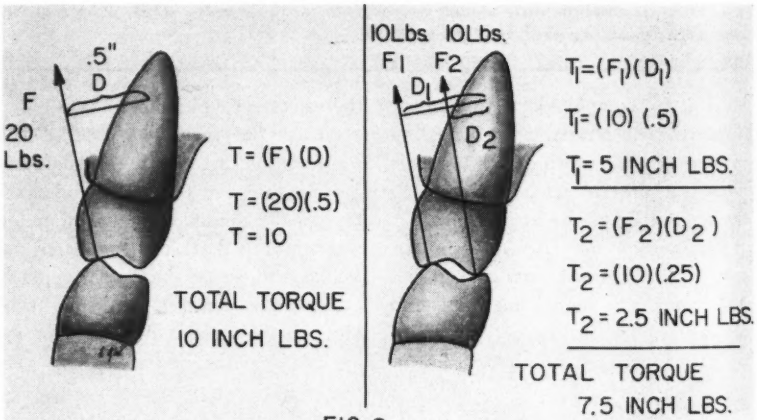


FIG. 8

8. ***In lateral eccentric clenching, buccal contact produces more torque on the upper tooth than when there is buccal and lingual contact. Arbitrary distances and forces are used for comparison purposes. Torque is the product of the force multiplied by the perpendicular distance from the center of rotation (apical third). The formula is T=F D; a total occlusal force of 20 pounds is applied in both cases. With only buccal contact the line of force is 0.5 inches from the center of rotation, producing a torque of 10 inch-pounds. With buccal and lingual contact each contact area receives 10 pounds of occlusal load. The torque from the buccal cusp is 5 inch-pounds while the torque from the lingual cusp is 2.5 inch-pounds, making a total of 7.5 inch-pounds.***

ent and the same 20 pounds is exerted by the mandibular tooth, each incline has 10 pounds exerted on it. The torque resulting from the upper buccal cusp incline will be 5 inch-pounds. If the perpendicular distance from the center of rotation to the line of force from the upper lingual slope is 0.25 inches, the torque will be 2.5 inch-pounds.

Total Torque on Upper Tooth — The total torque on the upper tooth is obtained by adding the values from the upper buccal and lingual cusps:

Buccal cusp ..... 5 inch-pounds
Lingual cusp .. 2.5 inch-pounds
7.5 inch-pounds

total torque on the upper tooth. The force diagrams are shown in Figure 8.

Comparison of Total Torque Values—Comparing the total values demonstrated, it is seen that in lateral eccentric clenching when there is buccal and lingual contact the torque is less on the upper tooth than when there is only buccal contact. The reverse is true, however, for the lower teeth.

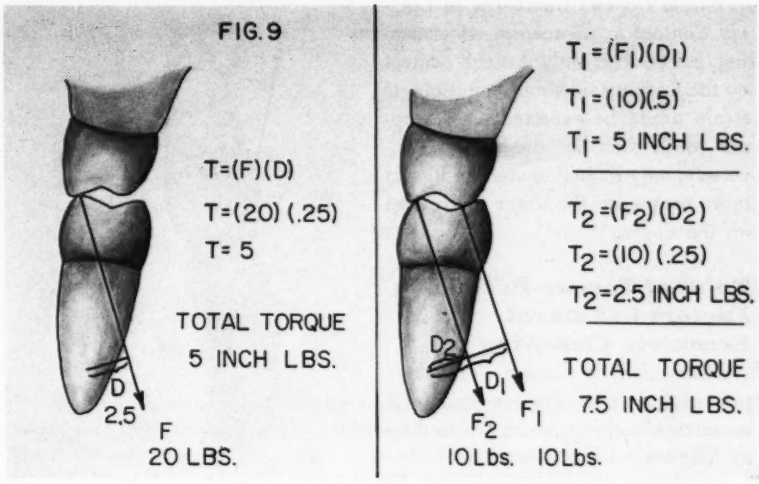
Less Torque on Lower Teeth: In lateral eccentric clenching (Fig. 9) buccal contact results in less torque on the lower (5 inch-pounds) than when buccal and lingual contacts are present (7.5 inch-pounds).

Equal Distribution of Torque: It is interesting to note that the only time the torque is equally distributed to the upper and the lower teeth is when there is buccal and lingual contact.

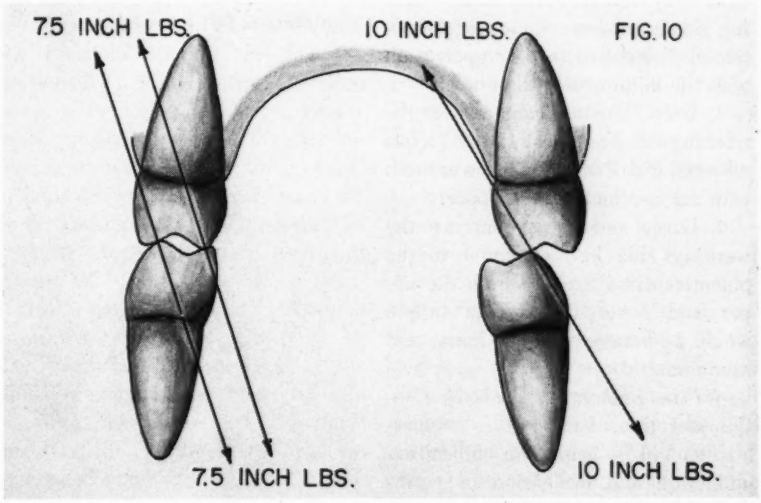
Comparison of Torque on the Working Side—With the aid of the same arbitrary forces and distances previously used, the balancing side torque is 10 inch-pounds (Fig. 10). Figure 11 illustrates the comparison of torque on the working side of the upper and lower teeth when there is only one area of occlusal contact. With only buccal contact, the torque on the upper is 10 inch-pounds compared to 5 inch-pounds on the lower; with only lingual contact the situation is reversed and there is 5 inch-pounds on the upper and 10 inch-pounds on the lower.

Torque Explained — The explanation is simple even without the aid of mathematics. One tooth is favored over the other when the line of force falls closer to its center of rotation than its opposing tooth. The distance from the center of rotation is labelled (D and d). For this comparison see Figure 11.

Origin of Highest Torque Value—Abstract torque values for different occlusal relationships are meaningless unless they can be applied to the clinical problems of the mouth. Using the values shown in Figures 8, 9, 10, and 11 as a guide it is reasonable to conclude that balancing side contact during clenching can result in the highest torque value of the various eccentric positions. This torque would be equally distributed to the upper and lower teeth. This does not mean that balancing contact *per se* is destructive, because the more teeth that share the load the less the physiologic strain. Balancing side prematurities however, because of the mechanics involved, would induce an extremely destructive force.



9. ***In lateral eccentric clenching, buccal contact produces less torque on the lower (5 inch-pounds) than when there is buccal and lingual contact (7.5 inch-pounds).***



10. ***With buccal and lingual contact on the working side, the total torque is 7.5 inch-pounds on the upper and the lower. The balancing side torque is greater; 10 inch-pounds on each tooth. The same arbitrary forces and distances are used in all illustrations for comparative purposes.***

Buccal Contact Compared to Lingual Contact in Clenching—If clenching exists with only buccal contact on the working side, more physiologic strain might be expected on the upper tooth than on the lower; conversely, only lingual contact results in more torque on the lower tooth than on the upper.

Total of Torque-Producing Factors in Lateral Eccentric Clenching

Summation of Factors — The factors of torque production in lateral eccentric clenching can be summed up as follows:

1. Balancing side contact has the maximum torque potential which is distributed equally to both upper and lower teeth.
2. Only buccal contact on the working side has the maximum torque potential distributed to the upper tooth with the minimum to the lower.
3. Only lingual contact on the working side has the maximum torque potential distributed to the lower tooth with the minimum to the upper.
4. Buccal and lingual contact to the working side has an equal torque potential distributed to both the upper and lower teeth. This torque would be between the maximum and minimum.

Aid in Pathologic Evaluation — Consideration of the factors enumerated should be helpful in clinical examination and evaluation of periodontal disease and in oral reconstruction. Occlusion is only one factor in periodontal health[9] and in the final analysis the operator must use his own evaluation of a particular case because all of the factors discussed can be altered by variations in the following conditions:

(1) Axial inclination
(2) Buccolingual relationship
(3) Alveolar height
(4) Root anatomy
(5) Temporomandibular function

Bruxism

Examination of study models of patients usually shows some signs of bruxism demonstrated by wear facets. Deep condylar fossa and deep overbite are usually associated with limited lateral eccentric movements.[17] Perhaps if these patients have a need for muscle activity, they clench more than bruxate. The majority of patients, while having a range of condylar motion and occlusion, do show some signs of facet formation.

[17]Miller, S. C.: Personal Communication.

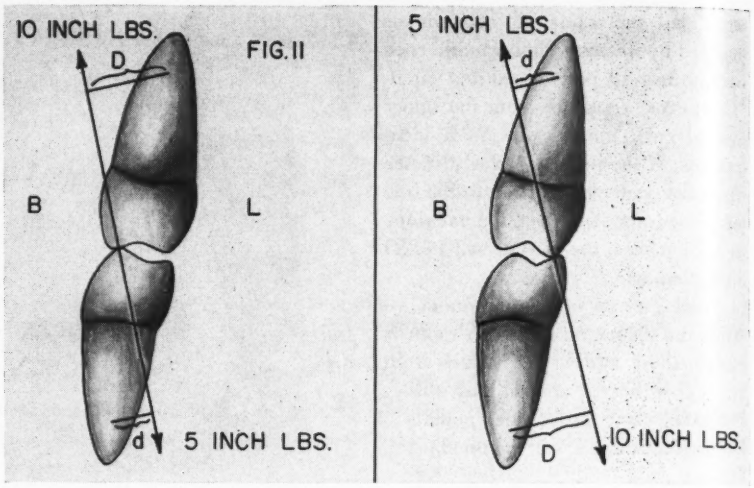


FIG. 11

11. ***Comparison of single contact areas can be made as to the effects on the teeth involved. Buccal contact favors the lower with less torque production (5 inch-pounds) at the expense of the upper (10 inch-pounds). Lingual contact favors the upper (5 inch-pounds) at the expense of the lower (10 inch-pounds.) In nonmathematical terms, when the line of force falls closer to the center of rotation there is less lateral force.***

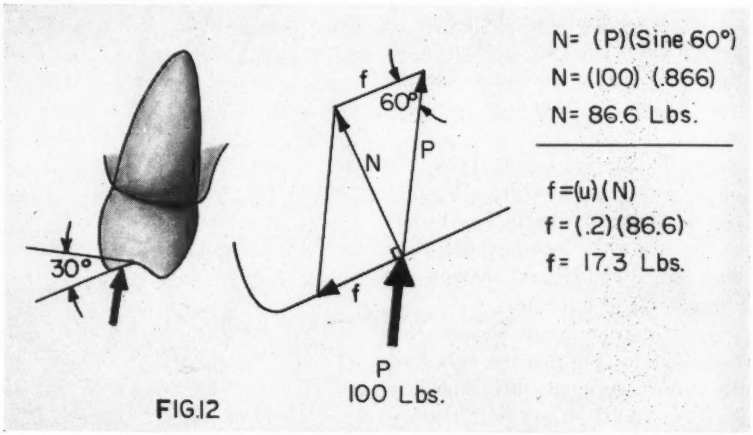


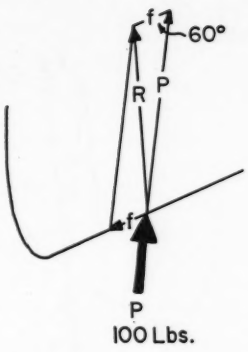
FIG. 12

12. ***Bruxism implies movement. Frictional resistance of the surfaces changes the angulation of the resultant force. To find the resultant force and its angulation from a 30-degree cusp with an occlusal load of 100 pounds it must be known how much force resists the movement up the incline toward centric due to friction. This is represented by (f) in the diagram. The force of friction (f) is equal to the product of the coefficient of friction (a constant for a particular substance) multiplied by the perpendicular force pressing the two objects together (f=u N). The coefficient here is 0.2 for polished metals but the occlusal load (P) is not perpendicular to the plane, therefore (N) must be calculated by geometry. (N) equals 86.6 pounds; by substituting the force of friction (f) resisting the movement up the incline is 17.3 pounds.***

Torque Distributed to Support of Teeth — Bruxism, or nonfunctional movements of the teeth against each other, causes stress and torque distributed to the support of the teeth. Cuspal inclines are often thought of as a primary factor in the resultant force to the bone but there are many

other factors known and unknown that play an important role in this contribution to tissue loss.

Different Forces May Occur Concurrently—It would be difficult to determine whether a patient is merely bruxating or clenching with great muscular force at the same time. Clenching and bruxating have been artificially separated here for descriptive purposes because the forces are different; due to muscular action and control they may occur concurrently.



LAW OF COSINE

$C^2 = A^2 + B^2 - 2AB(\cos \theta)$

$R^2 = f^2 + P^2 - fP(\cos 60°)$

$R^2 = (17.3)^2 + (100)^2 - 2(17.3)(100)(.5)$

$R^2 = 10{,}299 - 1730$

$R^2 = 8569$

$R = 92.6$ Lbs.

FIG. 13

13. ***To find the resultant force (R) from the occlusal load of 100 pounds (P) which is modified by the force of friction (f) resisting the movement up the incline (17.3 pounds) the law of cosine is used. By substituting in the formula the resultant force is 92.6 pounds which is less than the original 100 pounds.***

Relation of Frictional Resistance and the Incline Plane in Bruxism

Frictional resistance of the contacting surfaces and the cuspal inclines have an important relation to the resultant force due to bruxism. The frictional resistance of the two surfaces in contact is an extremely important factor because with the same angle of the cuspal incline a higher frictional resistance between the bruxating surfaces produces a greater lateral stress.

Mathematical Analysis not Intended—Numbers will be used again only to demonstrate the relationship of the factors for comparison and are not to be interpreted as a mathematical analysis (1) because the exact pinpoint location of the axis of rotation is not possible, and (2) because of the many variables that would have to be measured in each case.

Degree of Force From Bruxating Pressure—If a bruxating pressure of 100 pounds is applied occlusally on a 30-degree cusp, what will be the resultant force (Fig. 12)?

In order to determine the resultant force it would be necessary to know what the force of friction is which resists the movement of the cusp on the incline toward centric.

Equations—(1) The force of friction is equal to the coefficient of friction multiplied by the perpendicular force pressing the two objects together.[18]

(2) The coefficient of friction is a constant for any given material with a specific finish. For two metals with a good finish (polished) it could be 0.2. As the surface becomes rougher, the value becomes higher.

Degree of Resistant Force—To find the force of friction resisting the movement (f, Fig. 12) first the value must be found for the perpendicular force pressing the cusps together resulting from the occlusal force of 100 pounds. This perpendicular force (N) to the incline equals 86.6 pounds. The geometry for this value is shown in Figure 12.

The force of friction is equal to the coefficient of friction multiplied by the perpendicular force pressing the surfaces together; therefore, by substituting, the result is 17.3 pounds resisting the movement toward centric. See Figure 12.

Resultant Force of Tooth—Knowing the original occlusal force of 100 pounds and the 30-degree cusp, as well as the value of 17.3 pounds resisting the movement of the lower cusp toward centric, the resultant force of the tooth can be determined by geometry. The resultant force is found to be 92.6 pounds; the geometry and vector diagram of which are shown in Figure 13. This resultant force is 9 degrees more buccal in direction than the original vertical occlusal pressure of 100 pounds. Geometry and vector diagram are shown in Figure 14.

Increase in Frictional Resistance—If the coefficient of friction increases from 0.2 to 0.4 with the other values constant, by following the same steps as above the force of friction resisting the movement toward centric will be 34.6 pounds. The resultant force due to the increase in frictional resistance between the surfaces is 88 pounds. Even though the resultant force drops from 92.5 to 88 pounds, the angle increases another 9 degrees buccally, making it 18 degrees from the original occlusal direction.

Torque in Relation to Frictional Resistance—The torque is changed by the increase in frictional resistance. For purposes of comparison, if the center of rotation is arbitrarily set 1 inch above the original point of application of force, it is seen that with a resultant force of 92.5 pounds 9 degrees buccally from the vertical, the torque is 14.4 inch-pounds. When the coefficient of friction increases from 0.2 to 0.4, the resultant occlusal force is reduced to 88 pounds but is 18 degrees buccally from the long axis of the tooth. The torque now is increased to 27.2 inch-pounds; the force diagrams and geometry are shown in Figure 15.

Effect of Lubricants on Torque

The coefficient of friction is greatly reduced with a lubricant between the two surfaces. Saliva has a lubricating effect on the bruxating surfaces which acts to reduce the coefficient of friction. As yet the figures are not available on the values in the mouth but a reduction in the coefficient of fric-

[18] Hausmann, E., and Slack, S.: *Physics*, ed. 2, New York, Van Nostrand Company, 1941, pp. 79-80.

tion due to the lubricating action of saliva on a smooth surface tends to reduce the buccal angulation of the resultant force. This reduces the torque.

Some Common Causes of Friction—(1) Unpolished amalgams, (2) uneven guiding inclines, (3) poor marginal adaptation of restorations, and (4) rough enamel resulting from unpolished equilibrated surfaces, are a few examples of some of the causes for high coefficients of friction even with saliva interposed between the surfaces.

Rough Surfaces Source of Stress—One rough unpolished amalgam in a quadrant can cause a great deal of lateral stress localized on that tooth and its antagonist even though its guiding inclines may be in equilibration with its neighbors and the rest of the mouth. These rough surfaces may in themselves initiate or contribute to bruxism and/or clenching in an effort to eliminate the interference or roughness. The production of torque or lateral stress may be tolerated for long periods of time without obvious clinical manifestations or periodontal disease, but when it exceeds the physiologic resistance of the tissue it contributes to the resulting disease.[9]

Summary

In the general masticatory pattern the bolus moves from the buccal toward the lingual. In this process the lower buccal and the upper lingual cusps receive more wear from the bolus than their opposing surfaces. The remaining tooth surfaces, the upper buccal and the lower lingual cusps, chiefly serve to hold or guide the bolus with relatively less abrasive wear. As the viscosity of the bolus increases, the lateral force increases.

Bruxism, or tooth-to-tooth attrition, also contributes to the faster rate of wear on the lower buccal and the upper lingual cusps than their opposing surfaces. On the working side the faster wearing slopes (BLLU) are continuously in contact in lateral eccentric movements while only a part of the guiding inclines is in contact at any given time. When these same teeth act as the balancing side only the cusp inclines of the lower buccal and the upper lingual are in contact; thus bruxism can help cause the more rapid wear of the lower buccal and the upper lingual cusps than their opposing surfaces.

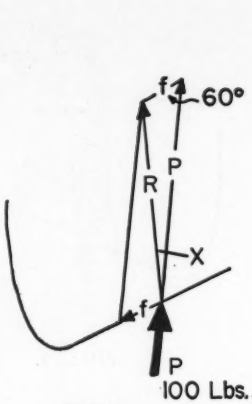


FIG.14

LAW OF SINE

$$\frac{a}{\text{SINE}\cdot A} = \frac{b}{\text{SINE}\cdot B} = \frac{c}{\text{SINE}\cdot C}$$

$$\frac{R}{\text{SINE } 60^\circ} = \frac{f}{\text{SINE } X^\circ}$$

$$\text{SINE } X = \frac{(f)(\text{SINE } 60^\circ)}{R}$$

$$\text{SINE } X = \frac{(17.3)(.866)}{92.6}$$

SINE X = .162

X = 9°

14. ***The resultant force (R) is 92.6 pounds. To find the angle, (X), this resultant force makes with the original vertical force, the law of sine is used. By substituting in the formula, the force of friction modifies the original vertical force of 100 pounds (P) to 92.6 pounds which is now 9 degrees from the original vertical direction.***

Eccentric clenching causes the resultant force to be perpendicular to the inclined planes causing a great deal of torque. If bruxism occurs without static lateral clenching then the amount of torque is related to the

(*Continued on page* 122)

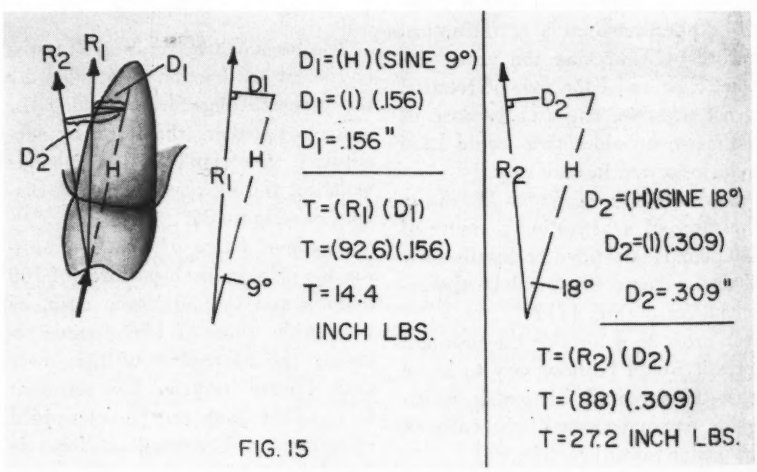


FIG. 15

15. ***Increased frictional resistance between bruxating teeth increases the lateral stress. As described in the preceding figures, the resultant force of 92.6 pounds (R_1) is 9 degrees buccally from the original vertical direction. The distance from the application of occlusal force to the center of rotation is arbitrarily placed at 1 inch (H). By simple geometry, the distance (D_1) from the center of rotation is found to be .56 inches. Torque equals the force (R_1) times the perpendicular distance (D_1) from the center of rotation or 14.4 inch-pounds.***

When the coefficient of friction increases from the original 0.2 to 0.4 between the bruxating teeth with the other values remaining constant the resultant force (R_2) drops from the original 100 pounds to 88 pounds. But, this force is now 18 degrees more buccal than the original vertical force. The distance (D_1) from the center of rotation is .309 inches. The torque then is 27.2 inch-pounds compared to 14.4 inch-pounds with the lower coefficient of friction.

The PROSTHETIC INDEX

ULYSSES CAMPBELL, D.D.S., East Orange, New Jersey

DIGEST

In the insertion of immediate dentures the operator often depends entirely on a sense of touch and approximation. When the exodontia has been completed, the extent of the required alveolectomy must be estimated. The problem is then one of the quantity and location of bone to be removed. The technique described in this article is recommended as an aid to accuracy and postoperative comfort for the patient.

Ridge Index Constructed

A clear acrylic ridge index, constructed prior to surgery, is used to achieve conformity of the ridge and the immediate denture. The same model (Figs. 1 and 2) may serve for both index and denture construction.

Method of Construction—The following steps are taken:

1. After the teeth have been cut away from the model ridge (Fig. 3), the ridge is trimmed to the required dimensions. The denture-bearing surface is tin-foiled.

2. A single layer of baseplate wax is applied (Fig. 4) covering the tin-foiled area.

3. The tin foil with baseplate wax is carefully removed in toto from the model and processed in clear acrylic.

4. The model is utilized in the conventional manner for the complete processing of the immediate dentures.

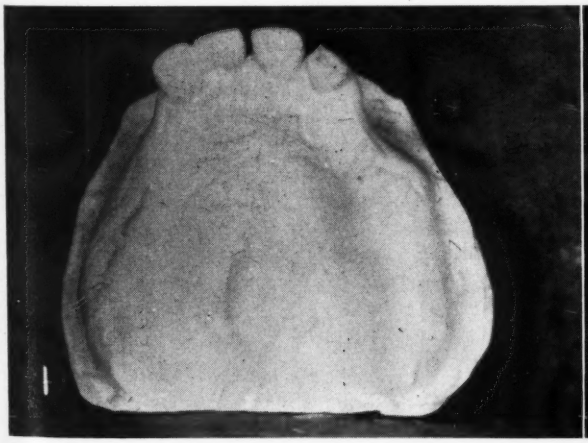
5. There are two appliances constructed from the same model: (1) a clear acrylic prosthetic index, and (2) a completed immediate denture.

Method to Determine Sites Requiring Alveolectomy

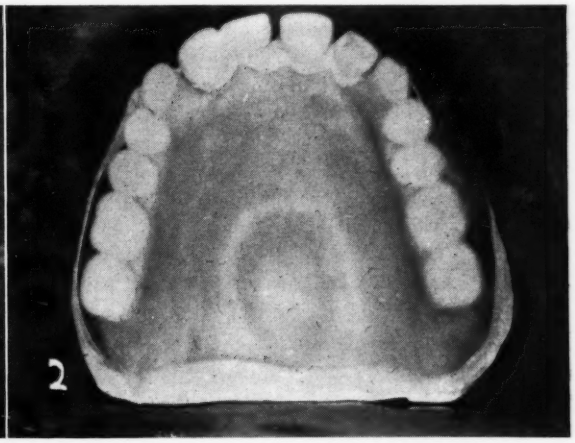
Both the index and the denture are available. Because of the manner of construction, the index must of necessity adapt only to the same ridge as the denture. For this reason, upon insertion of the index after exodontia, interfering alveolar protuberances will cause a blanching of the mucosa. The blanched areas indicate sites requiring alveolectomy.

Alveolar Removal—The index is returned to the mouth. Blanching may be noted in the same area, indicating incomplete alveolar removal. Blanching in other areas indicates the need of alveolar reduction in these areas. This procedure is repeated with the index in place until there is no blanching.

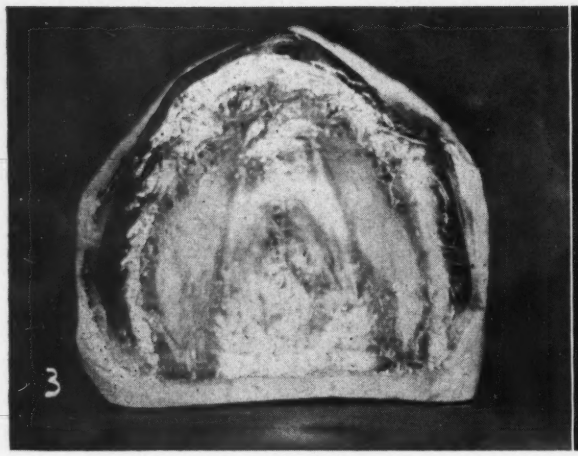
Removal of Soft Tissue—In approximating the edges of the mucosal



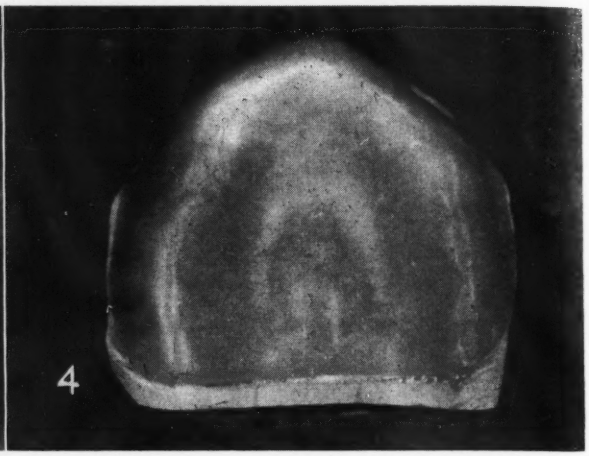
1. ***The master maxillary model which is to be utilized for the construction of both the prosthetic index and the full denture. The central and lateral incisor teeth are in their normal positions.***



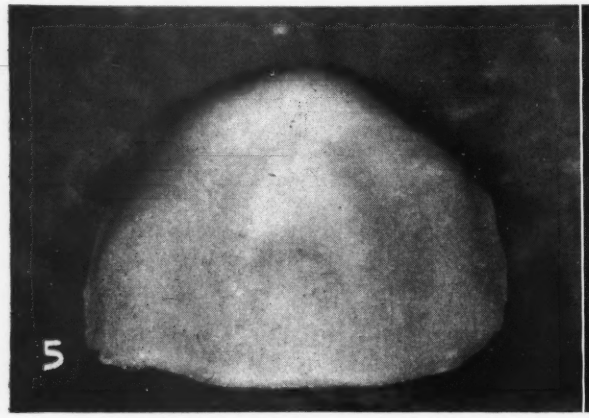
2. ***The master model with the artificial teeth set up. These have been returned to the model after the usual try-in.***



3. *The teeth have been removed from the master model and the necessary alveolar reduction completed. The model is tin-foiled in the usual manner.*



4. *A single layer of baseplate wax is softened and placed in position so that the tin foil is completely covered.*



5. *A view of the inferior surface of the tin-foiled wax-up of the prosthetic index, carefully removed from the master model.*

6. *A view of the superior surface of the tin-foiled wax-up of the prosthetic index.*

flap after completion of the necessary alveolectomy and the index has been placed in position, soft tissue "bunching" may be noted. This indicates the need for removal of soft tissue.

Comment

As previously stated, blanching beneath the prosthetic index indicates the necessity for alveolar reduction; bunching of the soft tissue indicates the need for removal of excess soft tissue.

As the index is used repeatedly during the alveolectomy, blood and mucus may adhere to it, obscuring visibility. A container of normal saline solution and a syringe may be included in the instrument tray prepared preoperatively.

The prosthetic ridge index has proved an invaluable aid in facilitating the insertion of immediate dentures and in easing the patient's discomfort. It is a guide which minimizes guesswork and increases accuracy.

27 *South Grove Street*

Force Distribution in Mastication, Clenching, and Bruxism

(*Continued from page* 120)

frictional resistance of the surfaces. Rough amalgams, or the poor marginal fit of restorations can cause a marked increase in the angle of the resultant force. Eccentric clenching can occur with bruxism which also increases the lateral forces. Mathematical resolution of these factors was given for the purposes of comparison.

Conclusion

On the basis of this discussion it is felt that the correction of premature contacts in eccentric relations should not follow the physiologic wear pattern. Corrective grinding should, however, eliminate the etiology of this trauma on the interfering guiding inclines. Correction of centric premature contact should be done first in relation to lateral eccentric movements.

515 *Ocean Avenue*

The EDITOR'S *Page*

FOR YEARS dentists have believed that epinephrine in a local anesthetic solution was contraindicated in cases of cardiovascular or hypertensive disease. In certain other conditions (asthma, the allergic state, drug sensitivity) epinephrine may produce untoward reactions. Even in the absence of demonstrable pathologic conditions the injection of *any* local anesthetic solution has been known to produce unpleasant reactions in some persons: increased pulse rate, overbreathing, profuse sweating, blanching of the face, syncope. Most of such reactions have been explained on a psychologic basis.

To determine what reactions epinephrine in 1:50,000 concentration might produce on healthy young subjects four investigators from the University of Illinois tested 19 dental students in 56 experiments.[1] The results were: "A controlled investigation, conducted on a blind basis, did not reveal clinically significant differences in systemic effect between 2 cubic centimeter doses of 2 per cent procaine hydrochloride solutions with and without epinephrine. Tracings from the finger plethysmograph, pneumograph, electroencephalograph, and electrocardiographs and data on blood pressure were used as criteria. Psychologically induced systemic effects were observed."

The investigators noted that there was an ebb and rise of psychologic tone that might be explained on the basis of release of intrinsic epinephrine from the adrenal medulla as the result of stress-producing stimuli from the environment. The hyperreactor, the sympathetic dominant subject, reacts more from stressful situations than does the parasympathetic subject. Some clinicians have tempered the response of the hyperreactor by using preoperative sedation before the injection of the anesthetic solution.

The authors present this pertinent summary of the status of local anesthetics commonly used in dental practice:

"1. There is good reason to doubt that vasoconstrictors in dental local anesthetic solutions have caused any fatalities, despite the very widespread use of such solutions on all kinds of patients. This does not mean that epinephrine in these solutions is harmless, but in the case of such a widely used and well-studied drug as epinephrine, the lack of reported fatalities is reassuring.

"2. In those extremely rare instances when injected local anesthetics may have caused a death, the anesthetic drug was perhaps responsible, rather than the vasoconstrictor. The psychophysiologic stress attending the injection or the other treatment could have a greater damaging effect than the drugs administered.

"3. The presence of a vasoconstrictor protects the patient against systemic effects of the anesthetic drug by two mechanisms. First, the vasoconstrictor limits diffusion of the anesthetic into the blood stream. Second, the vasoconstrictor counteracts some of the systemic actions of the anesthetic. It may enhance others, of course.

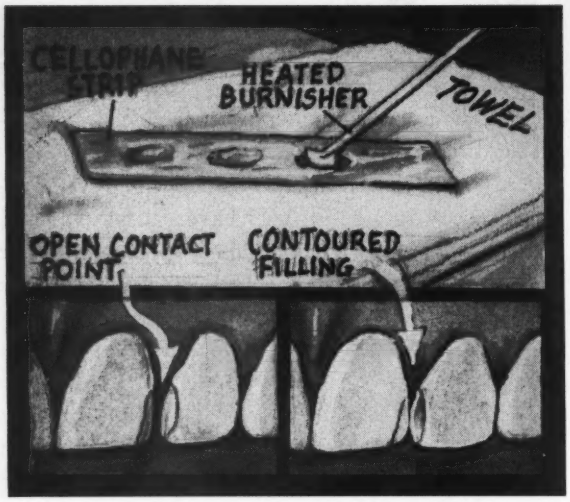
"4. When systemic effects of procaine solutions with and without epinephrine have been compared experimentally, slight but clinically insignificant differences in arterial blood pressure and pulse rate have been observed. Such differences are much less than the endogenous sympathomimetic effects.

"5. In certain situations which arise in the practice of medicine, one vasoconstrictor drug may be distinctly preferable to another. However, there is little clinical basis upon which to express a preference for one vasoconstrictor over any other for use in dental local anesthetics.

"6. There is not sufficient knowledge upon which to base precise recommendations with regard to safe amounts of vasoconstrictor or optimum rate of injection, in either normal or abnormal dental patients. The literature reveals that, depending upon the site, intraoral injections are likely to be intravascular in about 2 to 6 per cent of cases if ordinary nonaspirating cartridge syringes are used. The effect of intravenous administration of local anesthetic solutions is therefore a pertinent subject for investigation."

Despite the reassuring evidence from this investigation, dental clinicians will do well to follow the accepted technical procedures in local anesthesia: full assurance that a blood vessel has not been entered by the needle, slow injection, and the use of an anesthetic solution free from a vasoconstrictor if there is any doubt concerning the cardiovascular status of the patient.

[1]Wallace, Donald A.; Sadove, Max S.; Spence, John M.; and Gish, Gareth: Systemic Effects of Dental Local Anesthetic Solutions, Oral Surg., Oral Med., and Oral Path. 9:1297 (December) 1956.



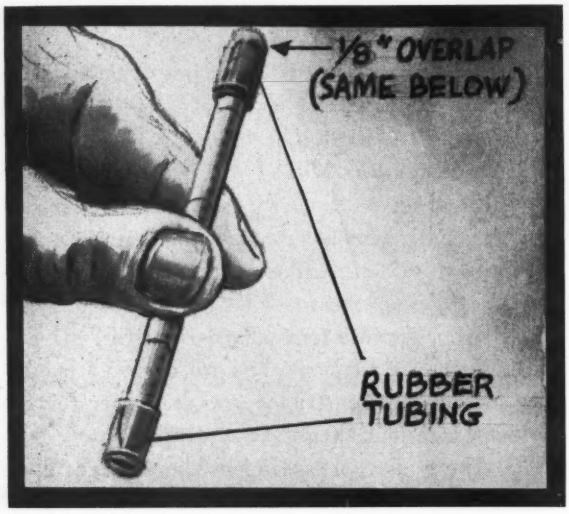
1

Clinical and Laboratory

Restoration of Open Contacts in Anterior Teeth

W. Bernard Mack, D.D.S., St. Louis

1. When the contact point is lost in Class III restorations, prepare a cellophane strip as follows: place the strip on a matted towel; heat a burnisher and place on the strip to make a depression of the desired depth and width. The use of this prepared strip will give proper contour to the restoration.

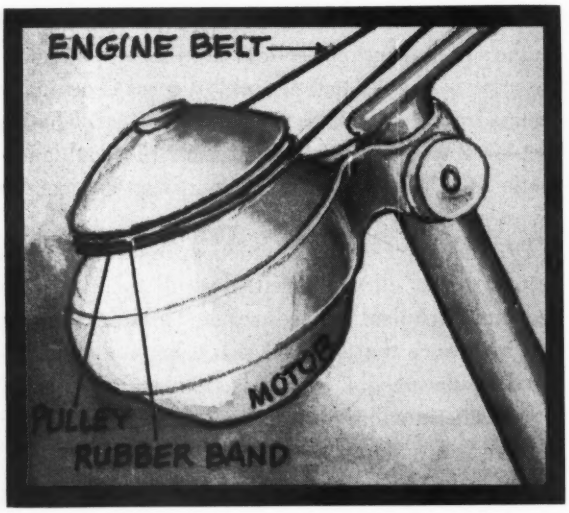


2

A Thermometer Protector

Walter C. Dorn, D.D.S., Silver Spring, Maryland

2. To protect the thermometer used in the x-ray processing solution, cut two pieces of ⅞-inch rubber tubing, each one inch long, and place one on each end of the thermometer. Allow the tubing to project ⅛ inch beyond the glass.



3

To Prevent Engine Belt Slipping

Philip C. McCauley, D.D.S., Copley, Ohio

3. A rubber band one-half the diameter of the pulley placed on the pulley *under* the engine belt will prevent slipping of the belt.

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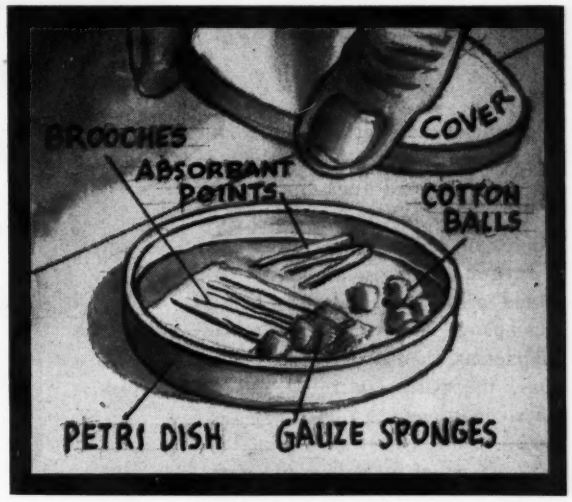
SUGGESTIONS . . .

The Use of a Petri Dish for Endontic Instruments

F. W. Edison, D.D.S., Kalamazoo, Michigan

4. A Petri dish may be used to hold endodontic instruments in the autoclave. After sterilization the covered dish may be stored in the cabinet until ready for use. A cotton sponge placed under the instruments will prevent water marks forming on the bottom of the dish.

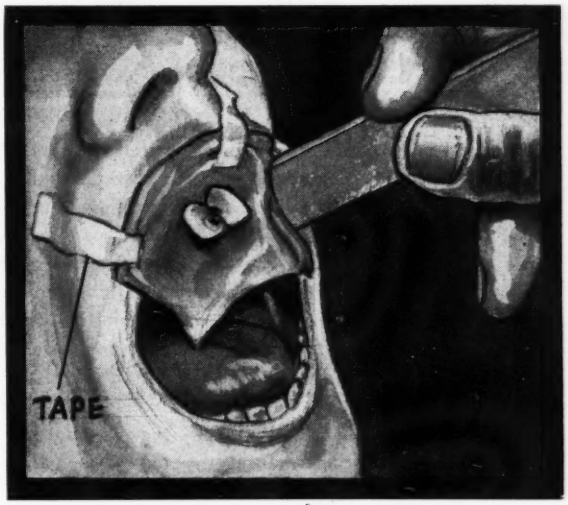


4

Midget Rubber Dam for Silicates and Endodontia

W. R. Eberle, D.D.S., Chicago

5. Use one-half or one-quarter size square of rubber dam and fasten the upper corners to the face with cellophane tape.



5

An Exodontia Pack

James N. Breen, D.D.S., Beaver Falls, Pennsylvania

6. Before packing the throat with gauze in oral surgical procedures, slightly moisten the gauze with water. This will prevent the gauze from adhering to the mucous membrane.

6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 136 for a convenient form to use.

Send your ideas to Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

MEDICINE and the Biologic Sciences

Antibiotic Therapy Failures

A common cause of antibiotic failure is empiric treatment of fever or other undiagnosed disease. When the etiology is obscure, diagnostic procedures, including bacteriologic and roentgenographic examinations, should precede therapy. Fever may accompany neoplasms, hematomas, lymphomas, leukemias, viral infections, the postoperative state, and other conditions not affected by antibiotics.

Treatment of impending infectious disease without bacteriologic culture may delay diagnosis. Often treatment is unsuccessful because the bacterial flora changes. Frequent cultures and sensitivity tests are necessary to detect organisms that emerge during therapy and also resistant strains and superinfection.

Increase in drug-resistant strains of staphylococci has become a serious problem. Important factors in the increase are (1) naturally resistant forms of bacteria, (2) emergence of resistant mutants, and (3) cross-contamination.

Use of agents known to induce development of resistant bacteria rapidly should be restricted whenever possible. Bacteriologic laboratory control is mandatory in treatment of severe fulminating infections and debilitating chronic sepsis.

Superinfection, a disease of different bacterial etiology from the original disorder, may convert a slight self-limited condition into a prolonged, severe, or even fatal disease. Factors predisposing to superinfection are (1) age of three years or less, (2) primary disease of the lower respiratory tract, (3) infection of the middle ear, (4) use of a substance or combination of agents with a wide spectrum, (5) primary infection of the ear, and (6) secondary pneumonia.

Prophylactic use of antibiotics generally is futile. It is an economic waste and may be detrimental. Prophylactic therapy may increase the number of resistant bacteria, allow superinfection, delay diagnosis and promote a deterioration in the quality of surgical technique and diagnostic acumen.

A system or tract normally harboring a polybacterial flora can seldom be effectively sterilized by systemically administered bacteriostatics. Most antibiotics are bacteriostatic rather than bactericidal. Prophylaxis frequently is unsuccessful since sufficient levels cannot usually be attained at the potential site of infection or contamination.

An important cause of antibiotic failure is inaccessibility of a lesion. Any chronic or recurrent septic process that produces fibrosis or scar tissue is difficult to reach with an optimal concentration of antibiotics because blood and lymph flow is reduced. Abscesses, sinuses, chronic lesions with multiple pockets of sepsis, fibrosis or scar tissue, and granulation are not cured by systemic or local chemotherapy and require surgery. Antibiotics, however, may prevent invasive infection into contiguous structures during surgery and such complications as metastatic abscesses and development of septicemia.

Deficiency in host defenses, as with agranulocytosis or leukemia, may prevent effective therapy. Antibiotic treatment is not successful unless fluid and electrolyte imbalance, nutritional, vitamin and protein deficiencies, diabetes mellitus, and other physiologic derangements are corrected. Failures also result from such factors as delay in starting treatment, early withdrawal of treatment, or inadequate dosage.

Howe, Chester W.: Causes of Failure in Antibiotic Therapy, M. Clin. North America **39**:1351-1356 (*September*) 1955.

Hypothyroidism

Thirty-five years ago the region about the Great Lakes was recognized as a goiter area. Hyperthyroidism occurred quite frequently. The principal cause of the condition was traced to the low iodine content of the drinking water.

During the early 1920's a large number of thyroidectomies were done. Shortly after, iodine salt was introduced. By 1940 the number of operations for the condition was reduced about 50 per cent. Since that time the number has been reduced another 50 per cent.

Iodine salt was introduced as a prophylactic measure. The product has been used by nearly everyone in this area during the past thirty years. There is considerable evidence to show that it has been a contributing factor in lowering the incidence of hyperthyroidism, particularly adolescent goiter.

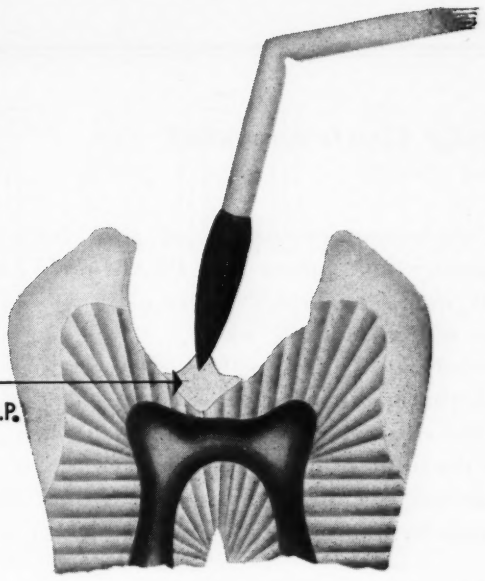
The salt is a valuable asset for those who would have developed hyperthyroidism. The salt is detrimental for those who would have developed some degree of hypothyroidism without the salt. The salt reduces a metabolic rate already normal or subnormal. Non-iodine salt is available for hypothyroid cases.

The widespread and increased use of fresh and frozen vegetables by a greater number of persons and in greater quantities than ever before is probably another factor that has lowered slightly the metabolic rate of some persons. Thus the frequency of

(*Continued on page* 130)

KAL-DROX

PREPARATION OF CALCIUM HYDROXIDE U.S.P.



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By a long record of clinical success, substantiated by repeat orders — as a cavity lining or/and an insulating base under all types of filling materials.

PLACED

by brush with such gentleness no sensation is felt, against the deepest cavity, the thinnest pulpal wall.

ADHESIVENESS

to maintain placement during immediate or subsequent filling.

SETS HARD

to insulate from all pressure, irritation or to form a complete cement base. Sets hard 5 to 7 minutes.

CALCIUM HYDROXIDE

to neutralize cement and silicate acids.

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in all deep cavities under all types of fillings and restorations.

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THIS COUPON is worth $1.50 on KAL-DROX as illustrated ($4.50). Purchase thru your dealer or send us coupon and check for $3.00.

Slightly Controversial

The first balloon ascension in America took place in 1792. It was a curious fact that the entire balloon was constructed and filled with materials that had been in existence for centuries. It simply took the mind of man that long to dream, to experiment, to accomplish.

It is likewise a fact that in many things, the materials lie waiting to be assembled in proper proportion, while man sits back and satisfies himself with what he already has.

It is with this in mind that we wish to apologize to the profession. Despite the fact that the means have existed for a few years, it is only now that our research has come up with a new system of autopolimerization which entirely eliminates the discoloring catylist in the powder, a new system of color control.

This is actually an outstanding discovery. Without instruments, it is actually impossible to distinguish any color change in the test samples. And if this were not a professional publication, we would offer a reward to anyone who could demonstrate color change or discoloration in new PEARLon '57.

The same thing applies to P.F. '57. In addition to all of this, both P.F. '57 and PEARLon '57 are fluorescent in ultra violet light.

Now we would like to review the attributes of PEARLon '57. We would like you to compare these properties to any other anterior filling material you are using, whether porcelain or plastic.

PEARLon matches tooth structure so that it is impossible to distinguish the filling.

PEARLon can be blended by the dentist to be as opaque or as translucent as is necessary.

PEARLon is fluorescent and does not darken in fluorescent or ultra violet light.

PEARLon is insoluble in mouth fluids and will never wash out.

PEARLon is tenacious and needs little undercutting for retention. This in turn saves vital tooth structure.

PEARLon contains molectite, which gives it great abrasive resistance.

PEARLon contains an adhesive, the same adhesive that meets U.S. Air Force specifications for prop repair.

PEARLon expands slightly upon setting. Margins are completely sealed.

PEARLon is completely color stable.

PEARLon is NOT another acrylic filling material. It is a true mineral plastic.

If you will try this test you will be convinced. Take a recently extracted tooth and prepare a cavity without undercuts. Place a PEARLon filling. Now freeze it in an ice cube for an hour or more. Next place it in boiling water for five minutes or more. Repeat this as often as you want. The PEARLon filling will not loosen or change color.

No other filling material will withstand this test, to our knowledge.

P.F. '57, a posterior filling material, has the same qualities as PEARLon but it is more opaque and thus more abrasion resistant, as is necessary for posterior teeth.

Send $1.00 for a generous sample or $2.00 for both.

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NEW PEARLON "57"

for all anterior fillings

FIRST in color stability

FINEST in esthetics

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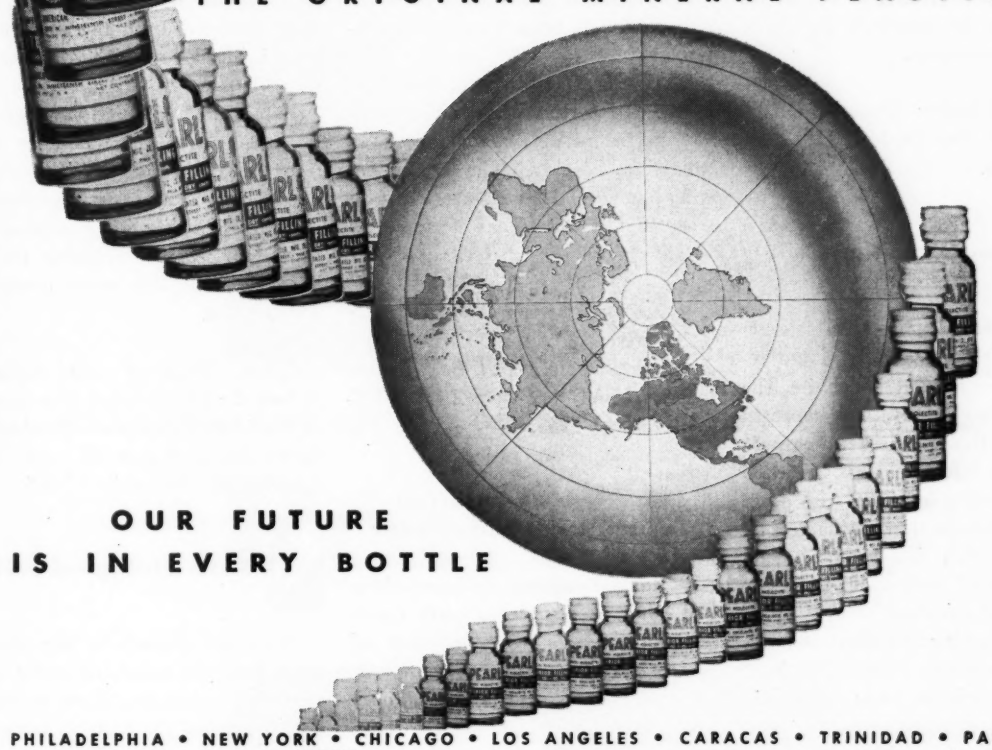
THE ORIGINAL MINERAL PLASTIC



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(*Continued from page* 126)
mild or borderline hyperthyroidism is decreased. Even canned vegetables retain more of their natural iodine content because modern canning procedures have been improved by such processes as pressure cooking.

Fresh, frozen, and canned vegetables have been transported over wider areas in recent years so that no longer does a person eat only the vegetables grown in his own community. In this way some vegetables rich in iodine content may be consumed in a community in which soil produces vegetables low in iodine, and vice versa.

In recent years an increasing number of persons have complained of a symptom complex that indicates hypothyroidism and a low metabolic rate. The principal clinical manifestations are obesity, fatigue, sleepiness, sluggishness or ungainly gait, and physical movements.

Sellers, Charles: Hypothyroidism, Michigan M. Soc. **54**:1182-1183 (October) 1955.

Tonsils—Removal

Tonsils and adenoids should be removed or irradiated only if the requirement for therapy is definite. The indications for treatment are repeated severe infections, persistent chronic or subacute infection with impaired health, recurring infection with acute otitis and conduction hearing loss, obstruction with facial and palatal deformity, and metastatic, toxic, or allergic focal infection.

Acute recurring infections and systemic disturbances caused by focal infections, such as some rheumatic and kidney diseases, may be controlled by therapy with sulfa drugs or antibiotics. Tonsils that are definite foci of infection, however, should be removed.

Surgery is more likely than irradiation to eliminate focal infection, recurring tonsilitis and otitis media. If allergc disturbances are precipitated by tonsil and adenoid infection and treatment directed against the allergy is unsuccessful, operation is advisable. Tonsils that are not clearly involved in the allergic reaction should not be removed. Irradiation may give relief for about a year. Sometimes irradiation is preferable to operation in infants since the tonsils help develop an immunity to infections. If tonsils are removed before the third year, the child is prone to colds and is less likely to be vigorous. Surgery, however, should not be delayed if obstruction is severe.

When lymphoid follicles are scattered irradiation may be chosen since the action is widespread. The technique may be used for patients in poor general condition or when bleeding tendency exists. Generally, a reduction in size of the mass of tonsils and adenoids cannot be demonstrated after roentgen therapy. Also, no pathologic changes are evident in specimens of tonsils removed after irradiation.

Removal of tonsils probably does not predispose to poliomyelitis, unless for a short period immediately after operation. Severe bulbar and bulbospinal forms, however, are common when the disease does occur after tonsillectomy.

Galloway, Thomas C.: Symposion on Roentgen Therapy in Treatment of Tonsillar Disease, Quart. Bull. Northwestern Univ. M. School **29**:125-137 (*September*) 1955.

Semiambulation with Varicose Veins

Prolonged standing and heavy physical labor predispose to early manifestation and rapid progression of varicosities. In the treatment it is now felt that many industrial work hours can be saved if semiambulatory management is substituted for bed rest and immobilization.

Before operation, patients may continue working while complications such as pigmentation, ulcers, and varicose eczema are treated. Elastic bandages applied during the day control stasis so that ulcers heal. Parenteral antibiotics are administered if infection occurs.

When complications are eliminated surgery is performed. Procaine is injected along the course of each vein to be stripped. Incisions are usually made at the groin, midthigh, the area just below the knee, and the area just above the medial malleolus.

The long saphenous vein must be ligated flush with the femoral vein. If the dissection is not extended high enough, small branches are overlooked and varicosities recur. The entire vein and residual varicose vein segments are then stripped. Every useless perforating vein must be eliminated. Incompetent short saphenous veins are also stripped.

Patients are ambulatory almost immediately after surgery. They may be discharged the same day or the day following surgery. Within two or three days they return to work. A 4-inch rubber reinforced elastic bandage wrapped from the toes to the knee is worn during the day for two weeks.

Immediate ambulation decreases the incidence of inflammatory reactions and thromboembolic phenomena. Few, if any, postoperative injections of a sclerosing solution are necessary because stripping the entire saphenous vein severs communicating veins.

Cohen, Sidney M., and Nabatoff, Robert A.: The Surgical Management of Varicose Veins on a Semi-ambulatory Basis, Indust. M. and Surg. **24**:392-394 (*September*) 1955.

Skin Diving—Perils

The chief obstacle in skin diving, aside from the unnatural water environment, is pressure. Even at only a few feet below the surface, increased pressure can produce difficulty through changes in volume of gases in portable breathing apparatus and in the body. Normal atmospheric pressure doubles at 33 feet below the surface. At 66 feet the pressure is tripled with a corresponding decrease in gas volume.

A dive should be carefully planned to avoid oxygen lack. With a descent to 33 feet, a diver using compressed

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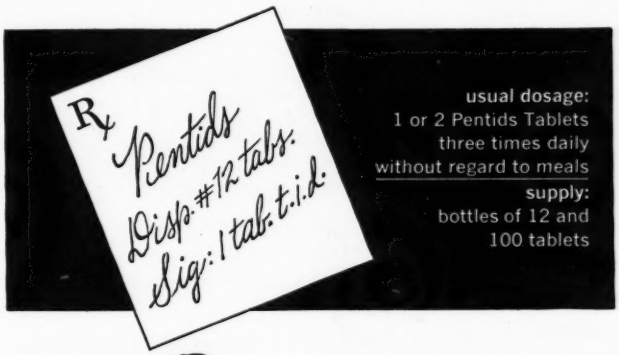
proved by five years' experience in millions of cases ...millions of doses

adjunctive therapy for the more common dental infections

Pentids

Squibb 200,000 Unit Buffered Penicillin G Potassium Tablets



usual dosage:
1 or 2 Pentids Tablets
three times daily
without regard to meals

supply:
bottles of 12 and
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Natural Bristle Brushes Available: Squibb Angle Toothbrushes, 2 or 3 row natural bristle, are available for your patients at all pharmacies.

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air has only half the volume of air the apparatus holds on the surface. The supply lasts, therefore, only half as long as the surface. Heavy exercise increases requirements to ten times normal. Cold water or panic also speeds the body metabolism.

The use of pure oxygen as air supply is often dangerous. Persons who tolerate oxygen poorly may have nausea, bronchial irritation, dizziness, emotional disturbances, muscle twitches, and convulsions. Symptoms are intensified with increasing pressures, and usually subside promptly after reaching the surface. Convulsions may continue for some hours.

If sufficient nitrogen dissolves in tissues during descent into water, during rapid ascent the gas evolves from the tissues faster than the blood stream can carry it away. Bubbles then may form to block capillary flow, producing anoxia in tissues supplied by the capillaries. Symptoms may be delayed as much as fifteen hours and a person making several dives in one day may sustain a cumulative effect from absorbed nitrogen even though the amount absorbed in a single dive is not harmful. Symptoms of a slight effect are itching and pain in the joints or muscles. More serious are dizziness, vomiting, paralysis, visual disturbances, and loss of consciousness. Shock must be treated as promptly as possible. Sedatives may be given for pains.

Carbon dioxide is concentrated by low temperatures, increased pressures, and inadequate ventilation. Divers using a closed-circuit mask for rebreathing air or home-made masks are most prone to the hazards of excess carbon dioxide. When the amount in inspired air reaches 5 per cent, panting occurs; 10 per cent produces loss of consciousness.

Holding the breath on ascent may cause rupture of alveoli and blood vessels so that air bubbles invade pulmonary circulation, collect in the left chambers of the heart and impede circulation. Sudden asphyxia and death may result.

Diving should not be done by obese persons or those who have arthritis, chronic otitis or sinusitis, heart disease, syphilis, or chronic gastrointestinal disturbances. Circulatory retardation imposed by cigarets and alcohol is also potentially dangerous.

Burns, William T.: Medical Problems of Skin Diving, JAMA **159**:5-9 (*July* 7) 1955.

Herpes Recurrens—Emotional Factors

PAUL WEICHSELBAUM, M.D.

HERPES recurrens, commonly called "fever blisters" or "cold sores," is one of the few virus diseases in man which does not lead to lasting immunity. It is initiated in infancy, childhood, adolescence, or early adulthood and may be manifested as typical herpes simplex or variants of vesicular eruption such as acute stomatitis. Specific neutralizing antibodies to the herpes virus are found in 65-90 per cent of adults and can be demonstrated by appropriate tests. The persistence of these antibodies in the serum is attributed to the continuing antigenic stimulus arising from the latent virus.

Characteristic Lesion — This is a localized group of vesicles on an erythematous base which usually occurs on or near the lips or on the external genitalia. Many types of stimuli can upset the physiologic balance against this infection and allow herpes simplex to appear.

Recurrence — The susceptibility to recurrence varies with the patient and the type and degree of the activating stimulus. Some highly susceptible patients may develop lesions at weekly or monthly intervals; others less sensitive, once in several years. Recurrence of the lesions may be periodic or irregular and is almost invariably limited to the same area of skin. The stimulus may be food, fever, exposure to sun, local trauma, menses, emotional upsets, or other factors.

Emotional Factors—The great majority of patients develop lesions shortly after some "trigger mechanism" upsets the antibody balance. A number of observers have found that emotional factors may induce herpes simplex.

Adapted from *Psychosomatic Medicine* **28**:81 (January-February) 1956.

Critical Evaluation of Ultrasonics in Operative Dentistry

(*Continued from page* 111)

1. The method of changing cutting tips is a disadvantage that is somewhat compensated for by the fact that fewer instrument changes are required than is the case in rotary instrumentation but it is inefficient for the operator to have to stop and pick up a wrench in order to change tips.

2. The handpiece cord is a little too short and should be made to hang so as not to tire the dentist.

3. Sometimes the abrasive spray is disturbing in upper anterior preparations. This is offset, however, by the patient's comfort during these procedures.

4. The problem of waste disposal may be solved by placing a separating bottle in the aspirator line to keep the aluminum oxide from clogging the plumbing.

5. Probably the only real disadvantage of the ultrasonic dental unit is its inability to cut gold for removing inlays and crowns. Despite the objections of patients concerning the expense of the removal of old gold restorations, gold is the only material which cannot be cut effectively with the ultrasonic dental unit.

Conclusions

The ultrasonic dental unit for cavity preparations and preparation of crowns and jackets has definitely acquired a permanent place in the dental armamentaria. In the practice reported here rotary instruments have become adjunctive equipment rather than the instruments of choice. This includes high speed and ultrahigh speed rotary equipment.

Patient acceptance has been 100 per cent with the ultrasonic dental unit. Out of 3,000 preparations, not a single patient treated has been willing to return to rotary instrumentation.

716 *North Country Club*

CLINICAL AND LABORATORY SUGGESTIONS

(*See pages* 124 *and* 125)

Form to be Used by Contributors

To: Clinical and Laboratory Suggestions Editor

DENTAL DIGEST
708 Church Street
Evanston, Illinois

From: _____

_____

Subject: _____

Explanation of Procedure:

Sketch:

Suggestions submitted cannot be acknowledged or returned.
$10 will be paid on publication for each suggestion that is used.

Contra-Angles

Wildness in the Streets

In 1956 more people were killed on our highways than the total killed in the Korean War. More than 100 persons a day lost their lives in automobile accidents in the United States.

Although highways are being constantly improved and automobiles are getting more powerful the accidents are usually human rather than mechanical failures. A steering mechanism breakage, brakes that do not respond, tires that blow out are the occasional causes of fatal accidents. Most disasters come because the mind (or lack of one) that guides the lethal mechanism is faulty. This does not necessarily mean a low-grade intellect, but rather a mind that has not been disciplined to live in a mechanized society.

Some light has been projected on the personality traits that make some persons accident-prone and disregardful of traffic regulations. This study was made by the United States Navy and published in the December 1956 issue of the *United States Armed Forces Medical Journal.*

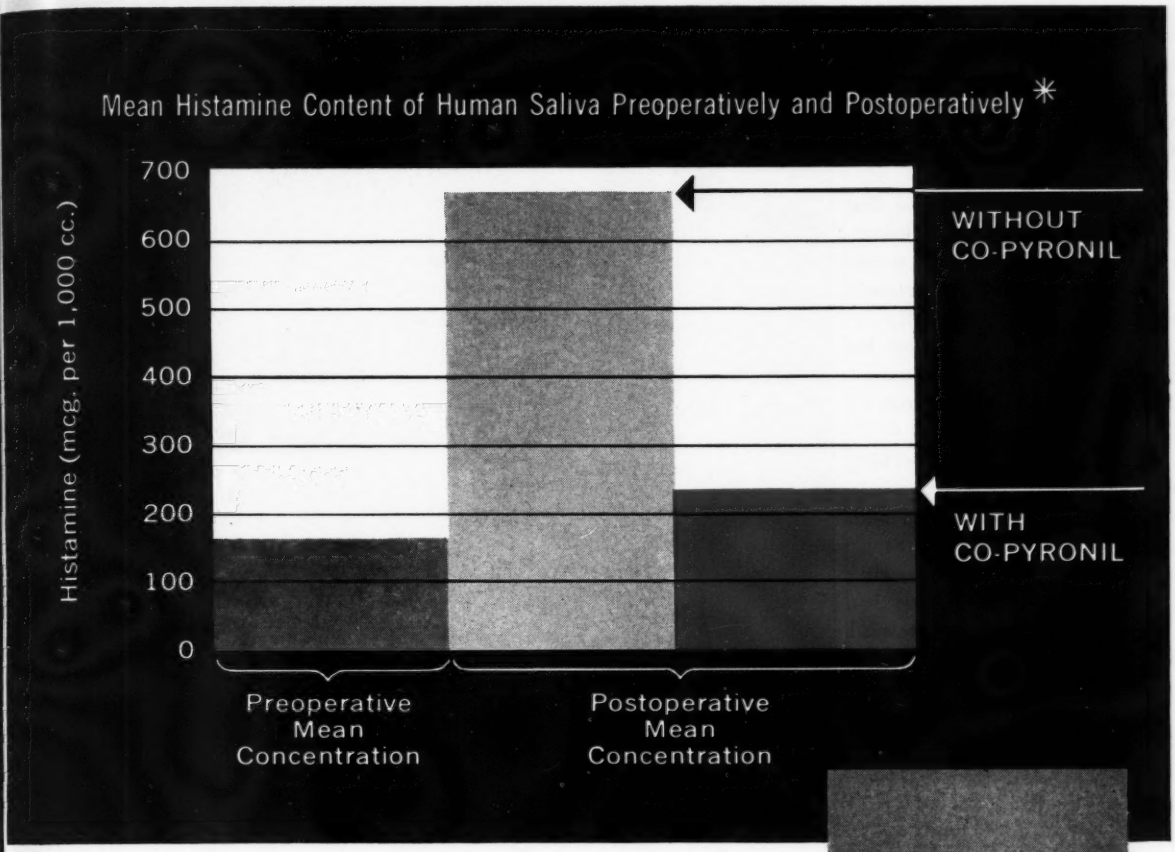
Most all of us take a deep delight in attempting to rate ourselves on various psychologic scales. Most of us also credit ourselves rather prodigiously in any area of doubt. We like to pat our ego on the back.

The study on automobile mishaps was made on the basis of psychologic inventories. Test yourself on the scale and see where you rate. If you are a safe and "good" driver free from accidents and brushes with the law you fall in the group with these characteristics:

"1. *Is more conservative and moderate in his attitudes*

a. Less attracted to the use of alcohol.

b. Less attracted to taverns.



fewer and less severe postoperative complications when you prescribe

CO-PYRONIL

(Pyrrobutamine Compound, Lilly)

Lilly
QUALITY / RESEARCH / INTEGRITY

Histamine causes increased capillary permeability and dilation of blood vessels. This induces exudate, edema, swelling, and trismus. These effects, in turn, contribute to the intensity of postoperative pain and retard healing.

During the last four years, antihistaminic therapy with 'Co-Pyronil' has been widely employed in dentistry. It has been reported to be a valuable aid in reducing undesirable effects of difficult extractions and other procedures that result in tissue trauma.

Dosage: 1 pulvule at least forty-five minutes preoperatively. Continue with 1 pulvule every four hours for six doses and then 1 pulvule every eight hours as long as needed.

*Adapted from J. Oral Surg., *13*:193, 1955.

758004

ELI LILLY AND COMPANY • INDIANAPOLIS 6, INDIANA, U.S.A.

c. Does not like to see women smoke.

d. Goes to church more often and is more attached to the church.

e. Prays more often.

f. Does not as readily agree that war is necessary under any conditions.

g. Is more careful whom he trusts.

h. Does not feel he has to bet on a race or game in order to enjoy it.

i. Is more concerned over his health.

j. Is less in favor of socialism.

"2. *Is socially more efficient*

a. Has a greater liking for working with people.

b. Has less difficulty dealing with groups.

c. Finds it easier to find interesting things to do.

d. Has a kinder attitude toward people.

"3. *Is socially more stable*

a. Doesn't feel like picking fights as often.

b. Doesn't lose his temper as easily.

c. Is not as easily upset or apt to take every little thing to heart.

d. Is happier with his job.

"4. *Has more mature outlook*

a. Isn't as quick to blame others for his troubles.

b. Isn't as prone to cry over spilt milk.

c. Has fewer misgivings about the past.

"5. *Has different tastes and interests*

a. Has greater liking for:

(1) Poetry

(2) Growing plants and collecting flowers

(3) Reading history

(4) Attending lectures on serious subjects

b. Has less liking for:

(1) Attending exclusive night clubs

(2) Dog and horse races

(3) Being an auto race driver

c. Has greater interest in education and science.

"6. *Is more conscientious and ambitious*

a. More willing to accept responsibility.

b. Can make decisions more easily.

c. Has a higher aspiration level.

d. Sets higher workmanship standards for himself.

e. Is not as easily influenced by other people.

f. Is more concerned with his personal independence.

"7. *Had happier childhood*

a. Had fewer arguments with his family.

b. Had fewer impulses to run away from home.

c. Was happier and more productive in school.

"8. *Has healthier attitude toward law*

a. Is more ready to believe law helps the common man.

b. Has had less trouble with the law.

c. Is more concerned with staying out of trouble with the law.

"9 *Has healthier attitude toward operating a vehicle on the highway*

a. Doesn't believe accidents are mostly due to luck.

b. Believes a good driver must always pay close attention to his driving.

c. Is more willing to share highway with trailer trucks and other vehicles."

Most of us when exercising our role as a mobile and amateur psychi-

atrist on the highway often impugn the mentality and the paternity of the people we meet en route. Some of us are more outspoken in our condemnations and resort to gutter and Anglo-Saxon short words. Fortunately for us who have passed out of the age group of physical combatants most of our imprecations fall among the exhaust fumes or upon the innocent ears of our own driving companions. We have all known dainty dears and gentlemen of the drawing room who resort to violent blasphemy when they take the wheel of an automobile and suffer the frustrations and annoyances from other drivers on the streets and highways.

I have found it admirable, if not always practicable, to withhold comments on the maniacal and antisocial behavior of fellow travelers on the public roads. In the first place, I find that my own alarm-reaction, to use Doctor Selye's term, is less stressful if I hold my temper. Second, my soliloquies and deprecations are not often appreciated by my riding companions, particularly when they are long-suffering in their awareness of some of the same traits in me that I am pointing out in the other fellow. Third, I find that I am more likely to preserve the continuity of my own tissues if I do not hurl audible invectives at unknown passing motorists. I have known a few people who were quite thoroughly assaulted with tire irons and other tools for their remarks cast at another motorist. This is easily understood when we realize that every *other* driver is at least slightly nuts. And being nuts he resents being told the truth.

If your driving record is good and you are not accident-prone you may have your ego inflated and your superiority acclaimed by the findings of the study made by the United States Navy:

"The characteristics of the accident-violation-free driver tend to lend themselves very well to that kind of driving behavior that is generally thought to be necessary for accident-free operation. In other words, the

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results are what one would expect. For example, we would certainly expect the safe driver to have a healthier attitude toward law. The fact that he is a more responsible person and is more conservative in his use of alcohol also logically fits the picture of a safe driver. The fact that he is more intellectually inclined and more at home with ideas equips him better to understand that traffic signs and laws are the attempt of society to protect itself—to understand that group living requires certain responsible behavior.

"Because driving upon the highway is essentially an interpersonal situation we would expect that the person who gets along best on the highway also gets along best with people. It is fitting that our accident-and violation-free driving group should bear the earmarks of better adjustment — a smoother home life and more ease in his relations with people.

"An item analysis of the test items provided a method of describing certain personality, sociologic, and attitudinal differences between the two groups. It was determined that the accident and violation-free driver is more mature, conservative, and intellectual in his interests and tastes, has a higher aspiration level, and is the product of a happier family background than is the accident-violation-incurring driver."

So there! Next time some *crazy* driver cuts you off in traffic, passes on a hill or curve, ignores a stop sign or light, or commits any one of the score of other violations of law and ethics—be patient. Keep your temper. Hold your tongue. Hope that the accident-prone violator will soon come face to face with the stern man riding beneath the flashing red Mar's light.

I do hope that I will remember this sage advice myself!

—E. J. R.

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